CONSTRUCTION PERMIT APPLICATION
NEW KILN LINE
(COURTESY COPY)
SUWANNEE AMERICAN CEMENT
BRANFORD PLANT
FACILITY ID NO. 1210465

FEBRUARY 25, 2005

Suwannee American Cement
SAC
Branford, Florida, USA

P.O. Box 410
Branford, Fl 32008

February 15, 2005

RECEIVED
FEB 25 2005
BUREAU OF AIR REGULATION

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 Line**
Suwannee American Cement – Branford Plant
Facility ID No. 1210465

Dear Ms Vielhauer:

Please find included in this package Suwannee American Cement's (SAC) Application for construction of a New Kiln Line at our existing site located in Branford. Since startup of the existing kiln in February 2003 SAC has worked with the Department to achieve the highest environmental performance possible while producing the highest quality cement in the market.

As a commitment to this SAC became the first and only cement plant in Florida to receive accreditation for our Environmental Management System (ISO 14000) by the International Organization of Standardization (ISO). SAC looks forward to continuing this success in the future and the addition of the New Kiln Line is one step towards this goal.

SAC has yet to select a vendor for the New Kiln Line project so detailed equipment information and vendor engineering are not yet available. SAC is carefully reviewing qualified vendors in order to insure the best technology available for emissions control. SAC will provide vendor details to the Department as soon as a vendor for the project is selected and these materials are available. However, SAC has completed a very comprehensive permit application for review by the Department. The following information is provided for the Departments review:

- Detailed Best Available Control Technology (BACT) Evaluation,
- Detailed 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.

SAC looks forward 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 directly at (386) 935-5000 or Tom Messer, or Joe Horton.

Sincerely,

Dan Fritz
CEO/President
Suwannee American Cement

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

Department of
Environmental Protection
Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

--- Detail Report ---

Application not submitted. Data current as of 2/18/2005

I. APPLICATION SECTION

APPLICATION IDENTIFICATION INFORMATION

Application Number: 629-1
Application Name: SUWANNEE CEMENT
Purpose of Application: AIR CONSTRUCTION PERMIT.
Application Comment: This application is to construct a new in-line kiln/raw mill/clinker cooler, clinker and cement processing equipment and other associated equipment at an existing Portland cement manufacturing plant. Throughput through certain existing equipment (e.g., primary crusher) will increase and will require modification to the current construction permit (1210465-001-AC, PSD-FL-259). The new equipment will trigger PSD for all criteria pollutants except lead.

Are you requesting a multi-unit or facility-wide emissions cap for one or more pollutants? NO

Does this facility currently hold a Title V air operation permit? NO

SCOPE OF APPLICATION

EU ID	Description	Permit Type
001	Primary crusher & assoc. belt conveyors	AC1A
003	Raw material processing - conveyor transfer pts.	AC1A
009	Coal conveying equipment	AC1A
New	New Clinker and Cement Processing with Baghouses	AC1A
New	New Coal Mill and Coal Transfer System with Baghouses	AC1A
New	New in line kiln/raw mill/clinker cooler w/ BH-main stack	AC1A
New	New raw material processing with baghouses	AC1A
New	Storage piles, paved and unpaved roads	AC1A

Note: Submit any required permit application fee, which you must calculate according to 62-4.050(4), F. A. C.. Contact the appropriate Permitting Office if you have any questions.

APPLICATION CONTACT INFORMATION

First Name: KENT
Last Name: BERRY
Job Title: CAA Program Manager
Name of Organization/Firm: ENVIRONMENTAL QUALITY MANAGEMENT, INC.
Telephone: 919 - 489 - 5299
Fax: 919 - 489 - 5552
E-mail: kberry@eqm-rtp.com
Street Address: 3325 DURHAM-CHAPEL HILL BOULEVARD
SUITE 250
City: DURHAM
State: NC
Zip: 27707

OWNER/AUTHORIZED REPRESENTATIVE INFORMATION

First Name: TOM
Last Name: MESSER
Job Title: Plant Manager
Name of Organization/Firm: SUWANNEE AMERICAN CEMENT, LLC
Telephone: 386 - 935 - 5000
Fax: 386 - 935 - 5080
E-mail: tomm@suwanneecement.com
Street Address: P.O. BOX 410

City: BRANFORD
State: FL
Zip: 32008

RESPONSIBLE OFFICIAL INFORMATION

First Name: TOM
Last Name: MESSER
Primary RO? YES
Job Title: Plant Manager
Name of Organization/Firm: SUWANNEE AMERICAN CEMENT
Telephone: 386 - 935 - 5000
Fax: 386 - 935 - 5080
E-mail: tomm@suwanneecement.com
Street Address: P.O. BOX 410

City: BRANFORD
State: FL
Zip: 32008
RO Qualification: For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.

PROFESSIONAL ENGINEER INFORMATION

PE UserName: BROOKSENG
Registration Number: 042489
First Name: STEPHANIE
Last Name: BROOKS
Job Title: President
Name of Organization/Firm: BROOKS AND ASSOCIATES
Telephone: 954 - 796 - 1987
Fax: 954 - 796 - 1984
E-mail: BROOKSENG@AOL.COM
Street Address: 5068 N.W. 85TH ROAD

City: CORAL SPRINGS
State: FL
Zip: 33067 - 1989

II. FACILITY SECTION

FACILITY IDENTIFICATION INFORMATION

Owner/Company Name: SUWANNEE AMERICAN CEMENT CO.
Site Name: SUWANNEE AMERICAN CEMENT
Description of Location: US 27 AT CR 49, 3.7 miles E. of Branford
Street Address: 5117 US Highway 27
City: BRANFORD
County: SUWANNEE
ZIP: 32008 - 0410
Relocatable: NO
Facility Status: A - ACTIVE
Comment: Portland Cement Plant preheater/precalciner kiln with in-line raw mill. Initial Startup of the 9 emissions units occured during January to March of 2003.

FACILITY LOCATION AND TYPE

Facility UTM Coordinates: Zone: 17 East(km): 321.4 North(km): 3315.9
Facility Latitude: Degrees: 29 Minutes: 57 Seconds: 45
Facility Longitude: Degrees: 82 Minutes: 52 Seconds: 10
Facility SIC Codes: **Primary:** 3241 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
CEMENT, HYDRALIC
CEMENT, HYDRAULIC
Governmental Facility Code: 0 - NONE (NON-GOVERNMENTAL FACILITY)
Facility Status: A - ACTIVE
Facility Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS

FACILITY CONTACT INFORMATION

First Name: JOE
Last Name: HORTON
Job Title: ENVIRONMENTAL MANAGER
Name of Organization/Firm: SUWANNEE AMERICAN CEMENT, LLC
Telephone: 386 - 935 - 5039
Fax: 386 - 935 - 5080
E-mail: jbhorton@suwanneecement.com
Street Address: POST OFFICE BOX 410

City: BRANFORD
State: FL
Zip: 32008

FACILITY REGULATORY CLASSIFICATIONS

Small Business Stationary Source: Not Applicable
Synthetic Non-Title V Source: No
Title V Source: Yes
Major Source of Air Pollutants Other than Hazardous Air Pollutants (HAPs): Yes
Synthetic Minor Source of Air Pollutants Other than Hazardous Air Pollutants (HAPs): No
Major Source of Hazardous Air Pollutants (HAPs): Yes
Synthetic Minor Source of HAPs: No
One or More Emission Units Subject to NSPS (40 CFR Part 60): Yes
One or More Emission Units Subject to Emission Guidelines (40 CFR Part 60): No
One or More Emission Units Subject to NESHAP (40 CFR Part 61 or Part 63): Yes
Title V Source by EPA Designation (40 CFR 70.3(a)(5)): No
Facility Regulatory Classifications Comment:

FACILITY POLLUTANT INFORMATION

Code	Description	Class.	Comment
CO	Carbon Monoxide	A	
DIOX	Dioxin/Furan	B	
H106	Hydrogen chloride (Hydrochloric acid)	A	
H114	Mercury Compounds	B	
NOX	Nitrogen Oxides	A	
PM	Particulate Matter - Total	A	
PM10	Particulate Matter - PM10	A	
SO2	Sulfur Dioxide	A	
VOC	Volatile Organic Compounds	A	

FACILITY ADDITIONAL INFORMATION

Description	Applicable?	Attachment?
AREA MAP SHOWING FACILITY LOCATION	No	No
FACILITY PLOT PLAN Previously submitted? NO Submittal Date:		Yes
PROCESS FLOW DIAGRAM(s) Previously submitted? NO Submittal Date:		Yes
PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER Previously submitted? YES Submittal Date:		No
LIST OF EXEMPT EMISSIONS UNITS (RULE 62-210.300(3)(a) or (b)1.,F.A.C.)	No	No
LIST OF INSIGNIFICANT ACTIVITIES	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE REPORT AND PLAN	No	No
LIST OF EQUIPMENT/ACTIVITIES REGULATED UNDER TITLE VI Equipment/Activities On Site but Not Required to be Individually Listed? NO	No	No
VERIFICATION OF RISK MANAGEMENT PLAN SUBMISSION TO EPA	No	No
REQUESTED CHANGES TO CURRENT TITLE V AIR OPERATION PERMIT	No	No
DESCRIPTION OF PROPOSED CONSTRUCTION OR MODIFICATION	Yes	Yes
RULE APPLICABILITY ANALYSIS	Yes	Yes
LIST OF EXEMPT EMISSIONS UNITS (RULE 62-210.300(3)(a) or (b)1.,F.A.C.)	No	No
FUGITIVE EMISSIONS IDENTIFICATION (RULE 62-212.400(2),F.A.C.)	Yes	Yes
PRECONSTRUCTION AIR QUALITY MONITORING AND ANALYSIS (RULE 62-212.400(5)(f),F.A.C.)	Yes	Yes
AMBIENT IMPACT ANALYSIS (RULE 62-212.400(5)(D),F.A.C.)	Yes	Yes
AIR QUALITY IMPACT SINCE 1977 (RULE 62-212.400(5)(h)5.,F.A.C.)	Yes	Yes
ADDITIONAL IMPACT ANALYSES (RULES 62-212.400(5)(e)1. and 62-212.500(4)(e),F.A.C.)	Yes	Yes
ALTERNATIVE ANALYSIS REQUIREMENTS (RULE 62-212.500(4)(g),F.A.C.)	No	No
OTHER FACILITY INFORMATION	Yes	Yes

FACILITY ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
ADDITIONAL IMPACT ANALYSES (RULES 62-212.400(5)(e)1. and 62-212.500(4)(e),F.A.C.)	No	Included in uploaded Attachment E	N/A	N/A
AIR QUALITY IMPACT SINCE 1977 (RULE 62-212.400(5)(h)5.,F.A.C.)	No	Included in uploaded Attachment E	N/A	N/A
AMBIENT IMPACT ANALYSIS (RULE 62-212.400(5)(D),F.A.C.)	Yes	Attachment E - Modeling Analysis Report		No
DESCRIPTION OF PROPOSED		Attachment C -		

CONSTRUCTION OR MODIFICATION	Yes	Regulatory Analysis Report		No
FACILITY PLOT PLAN	Yes	Attachment A - Facility Plot Plan	H:\5000\050430.0001\Permit Application Submission\Attachment A - Facility Plot Plan.pdf	Yes
FUGITIVE EMISSIONS IDENTIFICATION (RULE 62-212.400(2),F.A.C.)	Yes	Attachment D - Potential Emission Estimates	H:\5000\050430.0001\Permit Application Submission\Attachment D - Potential Emission Estimates (020905).pdf	Yes
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A
OTHER FACILITY INFORMATION	Yes	Attachment F - BACT Analysis	H:\5000\050430.0001\Permit Application Submission\Attachment F - BACT Analysis (021605).pdf	Yes
PRECONSTRUCTION AIR QUALITY MONITORING AND ANALYSIS (RULE 62-212.400(5)(f),F.A.C.)	No	Included in uploaded Attachment E	N/A	N/A
PROCESS FLOW DIAGRAM(s)	Yes	Attachment B - Process Flow Diagrams	H:\5000\050430.0001\Permit Application Submission\Attachment B - Process Flow.pdf	Yes
RULE APPLICABILITY ANALYSIS	No	Included in uploaded Attachment C	N/A	N/A

III. EMISSIONS UNIT SECTION

EU 001: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated: REGULATED
Type of EU: 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.
EU Description: Primary crusher & assoc. belt conveyors
EU Status: A - ACTIVE
Commence Construction Date:

Initial Startup Date: 1/14/2003
EU Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit: No
Package Unit Manufacturer:
Generator Nameplate Rating:
EU Comment: Incl. crusher and assoc. conveyors. Subject to NSPS subpart OOO.

EU 001: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
DUST SUPPRESSION BY WATER SPRAYS	Because the limestone proc. by the crusher and subsequent transfer equipment is mined below the water table and has a high moisture content, the previously entered control by water spray is incorrect.

EU 001: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate: 3450000
Maximum Process or Throughput Rate Units: T/YR
Maximum Production Rate:
Maximum Production Rate Units:
Maximum Heat Input Rate:
Maximum Incineration Rate:
Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment: Process rate is based on 17% moisture and includes weight of moisture.

EU 001: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram?
Emission Point Type Code: 4 - NO TRUE EMISSION POINT
Discharge Type Code: F - FUGITIVE EMISSIONS; NO STACK EXISTS
Stack Height:
Exit Diameter:
Exit Temperature:
Actual Volumetric Flow Rate:
Water Vapor:
Maximum Dry Standard Flow Rate:
Nonstack Emission Point Height: 10 feet

Emission Point UTM Coordinates:
Emission Point Latitude:
Emission Point Longitude:
Emission Point Comment:

EU 001: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500607
Units: Tons Material Unloaded
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Raw Material Unloading
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Raw material unloading
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

SCC Code: 30500609
Units: Tons Material Processed
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Primary Crushing
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Primary crushing
Maximum Hourly Rate: 3000
Maximum Annual Rate: 3450000
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment: Rate currently limited to 139,917 t/mo. Request increase to 3,450,000 t/yr.

SCC Code: 30500612
Units: Tons Material Handled
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Raw Material Transfer
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Raw material transfer
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:

Segment Comment:

EU 001: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive Emissions: 5.77 tons/year
Emission Factor:
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference:
Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment: PTE limited by material throughput limit

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive Emissions: 2.67 tons/year
Emission Factor:
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference:
Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment: PTE limited by material throughput limit

EU 001: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

*** NO POLLUTANT ALLOWABLE EMISSIONS INFORMATION FOUND FOR THIS EU ***

EU 001: VISIBLE EMISSIONS INFORMATION

Visible Emissions Subtype: VE10
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 10
Requested Allowable Opacity

in Exceptional Conditions:	
Maximum Period of Excess Opacity Allowed:	
Continuous Opacity Monitor Used:	No
Compliance Test Method(s):	
Visible Emissions Comment:	Limit applies to transfer points on belt conveyors

Visible Emissions Subtype:	**VE15**
Basis for Allowable Opacity:	RULE
Requested Allowable Opacity in Normal Conditions:	15
Requested Allowable Opacity in Exceptional Conditions:	
Maximum Period of Excess Opacity Allowed:	
Continuous Opacity Monitor Used:	No
Compliance Test Method(s):	
Visible Emissions Comment:	Limit applies to crusher

EU 001: CONTINUOUS MONITOR INFORMATION

*** NO CONTINUOUS MONITOR INFORMATION FOUND FOR THIS EU ***

EU 001: ADDITIONAL ITEMS

Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	Yes	Yes
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	No	No
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? NO Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN Previously submitted? NO Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes
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.)	No	No
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No
NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No

PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

EU 001: ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
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))	No	Included in uploaded Attachment F	N/A	N/A
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A
PROCESS FLOW DIAGRAM	No	Included in uploaded Attachment B	N/A	N/A

EU 003: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated: REGULATED
Type of EU: 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.
EU Description: Raw material processing - conveyor transfer pts.
EU Status: A - ACTIVE
Commence Construction Date:

Initial Startup Date: 1/15/2003
EU Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit: No
Package Unit Manufacturer:
Generator Nameplate Rating:
EU Comment: This EU is conveyor transfer points for raw mtl processing (D conveyors). Subject to BACT & NESHAPs subpart LLL.

EU 003: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
DUST SUPPRESSION BY WATER SPRAYS	Because the raw materials used have a high moisture content, the previously entered control by water spray is incorrect.

EU 003: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate:
Maximum Process or Throughput Rate Units: TONS/HOUR
Maximum Production Rate:
Maximum Production Rate Units:
Maximum Heat Input Rate:
Maximum Incineration Rate:
Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment:

EU 003: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram? D CONVEYORS
Emission Point Type Code: 4 - NO TRUE EMISSION POINT
Discharge Type Code: F - FUGITIVE EMISSIONS; NO STACK EXISTS
Stack Height:
Exit Diameter:
Exit Temperature:
Actual Volumetric Flow Rate:
Water Vapor:
Maximum Dry Standard Flow Rate:
Nonstack Emission Point Height:
Emission Point UTM Coordinates:

Emission Point Latitude:
Emission Point Longitude:
Emission Point Comment:

EU 003: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500612
Units: Tons Material Handled
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Raw Material Transfer
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Raw material transfer
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

EU 003: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive Emissions: 0.91 tons/year
Emission Factor:
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference:
Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment: PTE indirectly limited by throughput limit on EU 001.

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive

Emissions: 0.43 tons/year
Emission Factor:
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference:
Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment:

EU 003: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

*** NO POLLUTANT ALLOWABLE EMISSIONS INFORMATION FOUND FOR THIS EU ***

EU 003: VISIBLE EMISSIONS INFORMATION

Visible Emissions Subtype: VE10
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 10
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment:

EU 003: CONTINUOUS MONITOR INFORMATION

*** NO CONTINUOUS MONITOR INFORMATION FOUND FOR THIS EU ***

EU 003: ADDITIONAL ITEMS

Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	Yes	Yes
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	No	No
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? NO Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN Previously submitted? NO Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes
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.)	No	No
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No
NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No
PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

EU 003: ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
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))	No	Included in uploaded Attachment F	N/A	N/A
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A
PROCESS FLOW DIAGRAM	No	Included in uploaded Attachment B	N/A	N/A

EU 009: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated: REGULATED
Type of EU: 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.
EU Description: Coal conveying equipment
EU Status: A - ACTIVE
Commence Construction Date:

Initial Startup Date: 3/17/2003
EU Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit: No
Package Unit Manufacturer:
Generator Nameplate Rating:
EU Comment: Subject to VE limit of NSPS subpart Y and BACT for fugitive emissions

EU 009: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
DUST SUPPRESSION BY WATER SPRAYS	Emissions are limited by natural material moisture. The previously entered control by water sprays is incorrect.

EU 009: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate: 278000
Maximum Process or Throughput Rate Units: TONS/YR
Maximum Production Rate:
Maximum Production Rate Units:
Maximum Heat Input Rate:
Maximum Incineration Rate:
Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment: Rate is tons of coal and petcoke.

EU 009: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram? S CONVEYORS
Emission Point Type Code: 4 - NO TRUE EMISSION POINT
Discharge Type Code: F - FUGITIVE EMISSIONS; NO STACK EXISTS
Stack Height:
Exit Diameter:
Exit Temperature:
Actual Volumetric Flow Rate:
Water Vapor:
Maximum Dry Standard Flow Rate:
Nonstack Emission Point Height:
Emission Point UTM Coordinates:
Emission Point Latitude:

Emission Point Longitude:
Emission Point Comment:

EU 009: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500621
Units: Tons Material Processed
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Pulverized Coal Kiln Feed Units
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Coal and petcoke conveying
Maximum Hourly Rate: 300
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

EU 009: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive Emissions: 0.06 tons/year
Emission Factor:
Emission Factor Units:
Emission Factor Reference:
Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment: PTE limited by throughput limit

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive Emissions: 0.03 tons/year

Emission Factor:
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference:
Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment:

EU 009: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

*** NO POLLUTANT ALLOWABLE EMISSIONS INFORMATION FOUND FOR THIS EU ***

EU 009: VISIBLE EMISSIONS INFORMATION

Visible Emissions Subtype: VE20
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 20
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment:

EU 009: CONTINUOUS MONITOR INFORMATION

*** NO CONTINUOUS MONITOR INFORMATION FOUND FOR THIS EU ***

EU 009: ADDITIONAL ITEMS

Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	Yes	Yes
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	No	No
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? NO Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN Previously submitted? NO Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes

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.)	No	No
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No
NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No
PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

EU 009: ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
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))	No	Included in uploaded Attachment F	N/A	N/A
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A
PROCESS FLOW DIAGRAM	No	Included in uploaded Attachment B	N/A	N/A

NEW EU #1: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated:	REGULATED
Type of EU:	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.
EU Description:	New Clinker and Cement Processing with Baghouses
EU Status:	C - CONSTRUCTION
Commence Construction Date:	11/1/2005
Initial Startup Date:	11/1/2006
EU Major Group SIC:	32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit:	No
Package Unit Manufacturer:	
Generator Nameplate Rating:	
EU Comment:	This EU is the new clinker and cement processing operations controlled by baghouses. Subject to BACT & NESHAPs subpart LLL.

NEW EU #1: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
FABRIC FILTER HIGH TEMPERATURE (T>250F)	High temp fabric filters (L-03-02,L-06-02)
FABRIC FILTER MEDIUM TEMPERATURE (180F	Med temp fabric filters (M-08-02,N-12-02,N-91-02, N-09-02)
FABRIC FILTER LOW TEMPERATURE (T<180F)	Low temp fabric filters (L-25-02, M-09-02, N-36-02, P-03-02, P-11-02, Q-17-02)

NEW EU #1: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate:	1055467
Maximum Process or Throughput Rate Units:	TPY CLINKER
Maximum Production Rate:	
Maximum Production Rate Units:	
Maximum Heat Input Rate:	
Maximum Incineration Rate:	
Requested Maximum Operating Schedule:	24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment:	Requested limit is 1,055,500tons/12 months

NEW EU #1: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram?	
Emission Point Type Code:	3 - A CONFIGURATION OF MULTIPLE EMISSION POINTS SERVING A SINGLE EMISSIONS UNIT
Discharge Type Code:	V - A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL, OR NEARLY VERTICAL DIRECTION
Stack Height:	175 feet
Exit Diameter:	4 feet
Exit Temperature:	198 Fahrenheit

Actual Volumetric Flow Rate: 128600 acfm
Water Vapor: 3 %
Maximum Dry Standard Flow Rate: 100097 dscfm
Nonstack Emission Point Height:
Emission Point UTM Coordinates:
Emission Point Latitude:
Emission Point Longitude:
Emission Point Comment: Info is for N-09-02. N-12-02 is 26,793 dscfm at 175 ft ht., 3 ft dia. Total flow for all is 173,430 dscfm. Other points discharge horizontally.
VE Tracking Description # 1: L-03-02 Dust collector for clinker pan conveyor
VE Tracking Description # 2: L-06-02 Dust collector for clinker silo inlet
VE Tracking Description # 3: L-25-02 Dust collector for gyp/os clinker transport
VE Tracking Description # 4: M-08-02 Dust collector for clinker silo outlet conveyor
VE Tracking Description # 5: M-09-02 Gyp/os clinker silo outlet
VE Tracking Description # 6: N-09-02 Dust collector for finish mill air separator
VE Tracking Description # 7: N-12-02 Dust collector for finish mill vent
VE Tracking Description # 8: N-36-02 Fringe cement bin
VE Tracking Description # 9: N-91-02 Dust collector for finish mill (BH #3)
VE Tracking Description # 10: P-03-02 Cement transport conveyor
VE Tracking Description # 11: P-11-02 Cement silos
VE Tracking Description # 12: Q-17-02 Dust collector for cement truck loadout

NEW EU #1: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500616
Units: Tons Cement Produced
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Clinker Transfer
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type):
Maximum Hourly Rate:
Maximum Annual Rate: 1055467
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

SCC Code: 30500617
Units: Tons Cement Produced
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Clinker Grinding
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Clinker grinding (finish mill)
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:

Million Btu per SCC Unit:
Segment Comment:

SCC Code: 30500618
Units: Tons Cement Produced
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Cement Silos
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type):
Maximum Hourly Rate:
Maximum Annual Rate: 1191360
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

SCC Code: 30500619
Units: Tons Cement Produced
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Cement Load Out
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type):
Maximum Hourly Rate:
Maximum Annual Rate: 1191360
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

NEW EU #1: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER HIGH TEMPERATURE (T>250F)
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 14.87 lb/hour 65.11 tons/year
Synthetically Limited? N
Range of Estimated Fugitive Emissions:
Emission Factor: 0.01
Emission Factor Units: GRAINS/DSCF
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D

Pollutant Comment: BH temp. is for L-03-02 and L-06-02. See Attachment D for temp. of other baghouses.

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER HIGH TEMPERATURE (T>250F)
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 12.64 lb/hour 55.34 tons/year
Synthetically Limited? N
Range of Estimated Fugitive Emissions:
Emission Factor: 0.0085
Emission Factor Units: GRAINS/DSCF
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions:
Pollutant Comment: PM10 is est. to be 85% of PM

NEW EU #1: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.01
Allowable Emission Unit: GRAINS PER DRY STANDARD CUBIC FOOT
Equivalent Allowable Emissions: 14.87 lb/hour 65.11 tons/year
Method of Compliance: Initial PM test for N-09 & N-12, then VE in lieu of PM
Comment/Description of Operating Method: VE in lieu of PM test for other points and for N-09 and N-12 after initial test

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.0085
Allowable Emission Unit: ~~GRAINS PER DRY STANDARD~~ CUBIC FOOT
Equivalent Allowable Emissions: 12.64 lb/hour 55.34 tons/year
Method of Compliance: No test required unless PM test failed
Comment/Description of Operating Method: VE in ~~lieu of PM10 test for all~~ points unless PM test failed for N-09-02 and N-12-02

NEW EU #1: VISIBLE EMISSIONS INFORMATION

Visible Emissions Subtype: VE05
Basis for Allowable Opacity: RULE

Requested Allowable Opacity in Normal Conditions: 5
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment: VE limit is BACT

Visible Emissions Subtype: VE10
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 10
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment: Requirement of NESHAP. For NESHAP Method 9, test required initially & every 5 years. BACT limit is more stringent.

NEW EU #1: CONTINUOUS MONITOR INFORMATION

*** NO CONTINUOUS MONITOR INFORMATION FOUND FOR THIS EU ***

NEW EU #1: ADDITIONAL ITEMS

Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	Yes	Yes
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	Yes	Yes
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? YES Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN Previously submitted? YES Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes
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.)	Yes	Yes
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No

NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No
PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

NEW EU #1: ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
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))	No	Included in uploaded Attachment F	N/A	N/A
DETAILED DESCRIPTION OF CONTROL EQUIPMENT	No	Included in uploaded Attachment D	N/A	N/A
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.)	No	Included in uploaded Attachment E	N/A	N/A
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A
PROCESS FLOW DIAGRAM	No	Included in uploaded Attachment B	N/A	N/A

NEW EU #2: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated: REGULATED
Type of EU: 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.
EU Description: New Coal Mill and Coal Transfer System with Baghouses
EU Status: C - CONSTRUCTION
Commence Construction Date: 11/1/2005
Initial Startup Date: 11/1/2006
EU Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit: No
Package Unit Manufacturer:
Generator Nameplate Rating:
EU Comment: This EU is the new coal mill & pulverized coal bin controlled by baghouses. Subject to NSPS subpart Y and BACT. PM, VE limits of BACT are more stringent than NSPS.

NEW EU #2: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
FABRIC FILTER LOW TEMPERATURE (T<180F)	Fabric filters for coal mill (EP S-17-02) and coal transfer system (S-21-02)

NEW EU #2: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate: 150000
Maximum Process or Throughput Rate Units: TONS/YEAR
Maximum Production Rate:
Maximum Production Rate Units:
Maximum Heat Input Rate:
Maximum Incineration Rate:
Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment: Rate is amount of coal and petcoke crushed in mill. Request no throughput limit; PTE based on 8760 hr/yr and is independent of throughput.

NEW EU #2: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram? S-17-02 & S-21-02
Emission Point Type Code: 3 - A CONFIGURATION OF MULTIPLE EMISSION POINTS SERVING A SINGLE EMISSIONS UNIT
Discharge Type Code: V - A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL, OR NEARLY VERTICAL DIRECTION
Stack Height: 100 feet
Exit Diameter: 3 feet
Exit Temperature: 150 Fahrenheit
Actual Volumetric Flow Rate: 25000 acfm
Water Vapor: 6.5 %
Maximum Dry Standard Flow 20223 dscfm

Rate:
Nonstack Emission Point Height:
Emission Point UTM Coordinates:
Emission Point Latitude:
Emission Point Longitude:
Emission Point Comment: Info for S-17-02, coal mill stack. S-21-02 is 60 ft, 1.0 ft. dia, 1697 dscfm with horizontal exhaust.
VE Tracking Description # 1: S-17-02 Coal mill
VE Tracking Description # 2: S-21-02 Pulverized coal bin

NEW EU #2: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500621
Units: Tons Material Processed
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Pulverized Coal Kiln Feed Units
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Coal and petcoke crushing and conveying.
Maximum Hourly Rate:
Maximum Annual Rate: 150000
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment: Coal and petcoke crushing and conveying.

NEW EU #2: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER LOW TEMPERATURE (T<180F)
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 1.88 lb/hour 8.2 tons/year
Synthetically Limited? N
Range of Estimated Fugitive Emissions:
Emission Factor: 0.01
Emission Factor Units: GRAINS/DSCF
Emission Factor Reference: BACT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment:

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility

Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER LOW TEMPERATURE (T<180F)
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 1.6 lb/hour 7 tons/year
Synthetically Limited? N
Range of Estimated Fugitive Emissions:
Emission Factor: 0.0085
Emission Factor Units: GRAINS/DSCF
Emission Factor Reference: BACT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment: PM10 = 85% of PM

NEW EU #2: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.01
Allowable Emission Unit: GRAINS PER DRY STANDARD CUBIC FOOT
Equivalent Allowable Emissions: 1.88 lb/hour 8.2 tons/year
Method of Compliance: Initial test only for S-17-02
Comment/Description of Operating Method: Limit is BACT. Inital PM test for S-17-02 only, then VE in lieu of stack test. No initial PM test for S-21-02, only VE in lieu of stack test.

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.031
Allowable Emission Unit: GRAINS PER DRY STANDARD CUBIC FOOT
Equivalent Allowable Emissions: 5.36 lb/hour 23.5 tons/year
Method of Compliance: Initial stack test
Comment/Description of Operating Method: Limit applies only to S-17 and is 0.070 gram/dscm (as in NSPS, Subpart Y). BACT limit is more stringent. Only initial test required.

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.0085
Allowable Emission Unit: GRAINS PER DRY STANDARD CUBIC FOOT
Equivalent Allowable Emissions: 1.6 lb/hour 7 tons/year
Method of Compliance: Inital test only for S-17-02
Comment/Description of Operating Method: Limit is BACT. Inital PM test for S-17-02 only, then VE in lieu of stack test. No initial PM test for S-21-02, only VE in lieu of stack test.

NEW EU #2: VISIBLE EMISSIONS INFORMATION

Visible Emissions Subtype: VE05
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 5
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment: VE limit is BACT

Visible Emissions Subtype: VE20
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 20
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment: Requirement of NSPS Subpart Y, BACT is more stringent

NEW EU #2: CONTINUOUS MONITOR INFORMATION

Parameter Code: TEMP - Flue gas temperature
CMS Requirement:
Monitor Manufacturer:
Model Number:
Serial Number:
Installation Date:
Performance Specification Test Date:
Status: INACTIVE
Continuous Monitor Comment: Temp monitoring required for coal mill exit per NSPS, 40 CFR 60.253(a)(1)

NEW EU #2: ADDITIONAL ITEMS

Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	Yes	Yes
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	Yes	Yes
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? YES Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN		

Previously submitted? YES Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes
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.)	Yes	Yes
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No
NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No
PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

NEW EU #2: ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
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))	No	Included in uploaded Attachment F	N/A	N/A
DETAILED DESCRIPTION OF CONTROL EQUIPMENT	No	Included in uploaded Attachment D	N/A	N/A
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.)	No	Included in uploaded Attachment E	N/A	N/A
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A
PROCESS FLOW DIAGRAM	No	Included in uploaded Attachment B	N/A	N/A

NEW EU #3: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated: REGULATED
Type of EU: THIS EU 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).
EU Description: New in line kiln/raw mill/clinker cooler w/ BH-main stack
EU Status: C - CONSTRUCTION
Commence Construction Date: 11/1/2005
Initial Startup Date: 11/1/2006
EU Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit: No
Package Unit Manufacturer:
Generator Nameplate Rating:
EU Comment: This EU is the new in line kiln/raw mill and clinker cooler controlled by baghouse. Subject to BACT & NESHAPs subpart LLL.

NEW EU #3: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
FABRIC FILTER MEDIUM TEMPERATURE (180F	Med temp fabric filter.
STAGED COMBUSTION	Multi-stage calciner
SELECTIVE NONCATALYTIC REDUCTION FOR NOX	

NEW EU #3: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate: 215
Maximum Process or Throughput Rate Units: TPH-PH FEED
Maximum Production Rate: 127
Maximum Production Rate Units: TPH CLINKER
Maximum Heat Input Rate: 364 mmBtu/hr
Maximum Incineration Rate:
Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment: Request clinker limit of 1,055,467 tons/12 months. No preheater feed limit (redundant with clinker limit)

NEW EU #3: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram? E-21-02, MAIN STACK
Emission Point Type Code: 1 - A SINGLE EMISSION POINT SERVING A SINGLE EMISSIONS UNIT
Discharge Type Code: V - A STACK WITH AN UNOBSTRUCTED OPENING DISCHARGING IN A VERTICAL, OR NEARLY VERTICAL DIRECTION
Stack Height: 315 feet
Exit Diameter: 9.42 feet
Exit Temperature: 215 Fahrenheit
Actual Volumetric Flow Rate: 333000 acfm
Water Vapor: 15 %
Maximum Dry Standard Flow 221400 dscfm

Rate:
Nonstack Emission Point Height:
Emission Point UTM Coordinates:
Emission Point Latitude:
Emission Point Longitude:
Emission Point Comment:

NEW EU #3: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500623
Units: Tons Clinker Produced
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Preheater/Precalciner Kiln
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Dry process, preheater/precalciner kiln w/ in-line raw mill
Maximum Hourly Rate: 126.8
Maximum Annual Rate: 1055467
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

SCC Code: 39000201
Units: Tons Bituminous Coal Burned
Description 1: Industrial Processes
Description 2: In-process Fuel Use
Description 3: Bituminous Coal
Description 4: Cement Kiln/Dryer (Bituminous Coal)
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Cement kiln/precalciner bituminous coal use
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit: 27 (13.5 tons)
Segment Comment:

SCC Code: 39000402
Units: 1000 Gallons Residual Oil Burned
Description 1: Industrial Processes
Description 2: In-process Fuel Use
Description 3: Residual Oil
Description 4: Cement Kiln/Dryer
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Cement kiln/precalciner residual oil use
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:

1050 mmBtu

Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit: 1050
Segment Comment:

SCC Code: 39000602
Units: Million Cubic Feet Natural Gas Burned
Description 1: Industrial Processes
Description 2: In-process Fuel Use
Description 3: Natural Gas
Description 4: Cement Kiln/Dryer NG
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type):
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

SCC Code: 39000899
Units: Tons Coke Burned 13 tons
Description 1: Industrial Processes
Description 2: In-process Fuel Use
Description 3: Coke
Description 4: General: Coke
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Cement kiln/precalciner petroleum coke use
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit: 28
Segment Comment:

SCC Code: 39001299
Units: Tons Solid Waste Burned
Description 1: Industrial Processes
Description 2: In-process Fuel Use
Description 3: Solid Waste
Description 4: General
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Cement kiln/precalciner tires, tire derived fuel use. Calciner non-haz solid waste (filter fluff, wood waste, etc).
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor: 13tons
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit: 28
Segment Comment:

SCC Code: 39001399
Units: 1000 Gallons Liquid Waste Burned

Description 1: Industrial Processes
Description 2: In-process Fuel Use
Description 3: Liquid Waste
Description 4: General
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Kiln/calciner non-haz liquid waste (e.g., on-spec used oil)
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

NEW EU #3: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: CO
Pollutant Description: Carbon Monoxide
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 507.2 lb/hour 2111 tons/year
Synthetically Limited? Y
Range of Estimated Fugitive Emissions:
Emission Factor: 4
Emission Factor Units: LB/TON PRODUCED
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment:

Pollutant Code: DIOX
Pollutant Description: Dioxin/Furan
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER MEDIUM TEMPERATURE (180F
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 0.000001 tons/year
Synthetically Limited? N
Range of Estimated Fugitive Emissions:
Emission Factor: 0.4
Emission Factor Units: OTHER (SPECIFY IN COMMENT)
Emission Factor Reference: NESHAP LIMIT
Emissions Method Code:
Calculation of Emissions: Emission factor units: ng/dscm
Pollutant Comment:

Pollutant Code: H114

Pollutant Description: Mercury Compounds
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: WP - POLLUTANT REGULATED UNDER WORK PRACTICE STANDARD ONLY
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 0.015 lb/hour 0.061 tons/year
Synthetically Limited? Y
Range of Estimated Fugitive Emissions:
Emission Factor: 122
Emission Factor Units: OTHER (SPECIFY IN COMMENT)
Emission Factor Reference: REQUESTED LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment: Requested mercury input limit of 122 pounds per consecutive 12-month period.

Pollutant Code: NOX
Pollutant Description: Nitrogen Oxides
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: STAGED COMBUSTION
Secondary Control Device: SELECTIVE NONCATALYTIC REDUCTION FOR NOX
Total % Efficiency of Control:
Potential Emissions: 253.6 lb/hour 1055.5 tons/year
Synthetically Limited? Y
Range of Estimated Fugitive Emissions:
Emission Factor: 2
Emission Factor Units: LB/TON PRODUCED
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment:

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER MEDIUM TEMPERATURE (180F
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 28 lb/hour 116.3 tons/year
Synthetically Limited? Y
Range of Estimated Fugitive Emissions:
Emission Factor: 0.13
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment: Emission factor is lb/ton dry preheater feed, incl. recycle

Pollutant Code: PM10

Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER MEDIUM TEMPERATURE (180F
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 23.7 lb/hour 98.4 tons/year
Synthetically Limited? Y
Range of Estimated Fugitive Emissions:
Emission Factor: 0.11
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment: Emission factor is lb/ton dry preheater feed, incl. recycle

Pollutant Code: SO2
Pollutant Description: Sulfur Dioxide
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 34.2 lb/hour 142.5 tons/year
Synthetically Limited? Y
Range of Estimated Fugitive Emissions:
Emission Factor: 0.27
Emission Factor Units: LB/TON PRODUCED
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment: Control by low sulfur materials and inherently low emitting process.

Pollutant Code: VOC
Pollutant Description: Volatile Organic Compounds
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device:
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 15.2 lb/hour 63.3 tons/year
Synthetically Limited? Y
Range of Estimated Fugitive Emissions:
Emission Factor: 0.12
Emission Factor Units: LB/TON PRODUCED
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment: Control by low organic content materials and inherently low emitting process.

NEW EU #3: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

Pollutant Code: CO
Pollutant Description: Carbon Monoxide
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 4
Allowable Emission Unit: POUNDS PER TON OF PRODUCT
Equivalent Allowable Emissions: 507 lb/hour 2111 tons/year
Method of Compliance: Annual Method 10
Comment/Description of Operating Method: Limit is BACT.

Pollutant Code: DIOX
Pollutant Description: Dioxin/Furan
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.4
Allowable Emission Unit: NANOGRAMS PER DRY STANDARD CUBIC METER @ 7% O2
Equivalent Allowable Emissions: 0.000001 tons/year
Method of Compliance: Stack test
Comment/Description of Operating Method: Limit is 0.40 ng TEQ/dscm corrected to 7% oxygen. Initial test, repeated every 30 months.

Pollutant Code: H114
Pollutant Description: Mercury Compounds
Basis for Allowable Emissions Code: ESCPSD - REQUESTED BY APPLICANT TO ALLOW FACILITY OR MODIFICATION TO ESCAP PSD REVIEW
Future Effective Date of Allowable Emissions:
Allowable Emissions: 122
Allowable Emission Unit: POUNDS/YEAR
Equivalent Allowable Emissions: 0.015 lb/hour 0.061 tons/year
Method of Compliance: Material balance on raw mtls and fuels
Comment/Description of Operating Method:

Pollutant Code: NOX
Pollutant Description: Nitrogen Oxides
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 2
Allowable Emission Unit: POUNDS PER TON OF PRODUCT
Equivalent Allowable Emissions: 253.6 lb/hour 1055.5 tons/year
Method of Compliance: CEMS, 30 day rolling average
Comment/Description of Operating Method: Limit is BACT.

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Basis for Allowable Emissions

Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.13
Allowable Emission Unit: POUNDS PER TON OF FEED MATERIAL
Equivalent Allowable Emissions: 28 lb/hour 116.3 tons/year
Method of Compliance: Annual test, Method 5
Comment/Description of Operating Method: Allowable units are lb/ton dry preheater feed. Limit is BACT.

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.3
Allowable Emission Unit: POUNDS PER TON OF FEED MATERIAL
Equivalent Allowable Emissions:
Method of Compliance: Compliance by satifying BACT limit.
Comment/Description of Operating Method: NESHAP limit. Initial test & every 5 years required. Must be tested w/ & w/o raw mill in operation. BACT limit is more stringent. Compliance with BACT will ensure compliance with this limit.

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.11
Allowable Emission Unit: POUNDS PER TON OF FEED MATERIAL
Equivalent Allowable Emissions: 23.7 lb/hour 98.4 tons/year
Method of Compliance: Annual test, Method 201
Comment/Description of Operating Method: Allowable units are lb/ton dry preheater feed. Limit is BACT.

Pollutant Code: SO2
Pollutant Description: Sulfur Dioxide
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.27
Allowable Emission Unit: POUNDS PER TON OF PRODUCT
Equivalent Allowable Emissions: 34.2 lb/hour 142.5 tons/year
Method of Compliance: CEMS, 30 day rolling average
Comment/Description of Operating Method: Limit is BACT.

Pollutant Code: VOC
Pollutant Description: Volatile Organic Compounds
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.12

Allowable Emission Unit: POUNDS PER TON OF PRODUCT
Equivalent Allowable Emissions: 15.2 lb/hour 63.3 tons/year
Method of Compliance: CEMS, 30 day rolling average
Comment/Description of Operating Method: Limit is BACT.

NEW EU #3: VISIBLE EMISSIONS INFORMATION

Visible Emissions Subtype: VE10
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 10
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: Yes
Compliance Test Method(s):
Visible Emissions Comment: Requirements are BACT. Compliance demonstrated by COMS.

Visible Emissions Subtype: VE20
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 20
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: Yes
Compliance Test Method(s):
Visible Emissions Comment: COMS reqd. by NESHAP.

NEW EU #3: CONTINUOUS MONITOR INFORMATION

Parameter Code: EM - EMISSION
Pollutant(s) Monitored: NOX - Nitrogen Oxides
SO2 - Sulfur Dioxide
VOC - Volatile Organic Compounds
CMS Requirement:
Monitor Manufacturer: TBD
Model Number:
Serial Number:
Installation Date:
Performance Specification Test Date:
Status: INACTIVE
Continuous Monitor Comment: CEMS required for PSD, 62-212.400.

Parameter Code: TEMP - Flue gas temperature
CMS Requirement:
Monitor Manufacturer:
Model Number:
Serial Number:

Installation Date:
Performance Specification Test Date:
Status: INACTIVE
Continuous Monitor Comment: Mon. of temp at inlet to PM control device required by 40 CFR 63.1344

Parameter Code: VE - Visible emissions (opacity)
CMS Requirement:
Monitor Manufacturer:
Model Number:
Serial Number:
Installation Date:
Performance Specification Test Date:
Status: INACTIVE
Continuous Monitor Comment: COMS required for PSD, 62-212.400 and NESHAP 40 CFR 63.1350

NEW EU #3: ADDITIONAL ITEMS

Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	Yes	Yes
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	Yes	Yes
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? YES Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN Previously submitted? YES Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes
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.)	Yes	Yes
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No
NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No
PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

NEW EU #3: ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
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))	No	Included in uploaded Attachment F	N/A	N/A
DETAILED DESCRIPTION OF CONTROL EQUIPMENT	No	Included in uploaded Attachment D	N/A	N/A
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.)	No	Included in uploaded Attachment E	N/A	N/A
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A
PROCESS FLOW DIAGRAM	No	Included in uploaded Attachment B	N/A	N/A

NEW EU #4: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated: REGULATED
Type of EU: THIS EU 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).
EU Description: New raw material processing with baghouses
EU Status: C - CONSTRUCTION
Commence Construction Date: 11/1/2005
Initial Startup Date: 11/1/2006
EU Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit: No
Package Unit Manufacturer:
Generator Nameplate Rating:
EU Comment: This EU is new raw material processing operations controlled by baghouses. O&M plan is required for baghouses. Subject to BACT & NESHAPs subpart LLL.

NEW EU #4: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
FABRIC FILTER HIGH TEMPERATURE (T>250F)	High temp fabric filters for E-28-02 & E-34-02.
FABRIC FILTER MEDIUM TEMPERATURE (180F	Med. temp fabric filters for G-07-02 & H-08-02.
FABRIC FILTER LOW TEMPERATURE (T<180F)	Low temperature fabric filters for H-08A-02 & U-05-02.

NEW EU #4: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate: 215
Maximum Process or Throughput Rate Units: TONS/HOUR
Maximum Production Rate:
Maximum Production Rate Units:
Maximum Heat Input Rate:
Maximum Incineration Rate:
Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment: Max. proc. rate is tons dry preheater feed/hour for kiln/raw mill.

NEW EU #4: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram?
Emission Point Type Code: 3 - A CONFIGURATION OF MULTIPLE EMISSION POINTS SERVING A SINGLE EMISSIONS UNIT
Discharge Type Code: H - A STACK DISCHARGING IN A HORIZONTAL, OR NEARLY HORIZONTAL DIRECTION
Stack Height: 242 feet
Exit Diameter: 2.2 feet
Exit Temperature: 200 Fahrenheit

Actual Volumetric Flow Rate: 15000 acfm
Water Vapor: 2 %
Maximum Dry Standard Flow Rate: 11760 dscfm
Nonstack Emission Point Height:
Emission Point UTM Coordinates:
Emission Point Latitude:
Emission Point Longitude:
Emission Point Comment: Info is for G-07-02. See Attachment D for data on other stacks.
VE Tracking Description # 1: E-28-02 Dust collector for raw mill - Aeropol
VE Tracking Description # 2: E-34-02 BH is for off-spec feed handling.
VE Tracking Description # 3: G-07-02 Dust collector for homogenizing silo inlet
VE Tracking Description # 4: H-08-02 Dust collector for homo silo outlet
VE Tracking Description # 5: H-08A-02 Dust collector is for hydrated lime silo
VE Tracking Description # 6: U-05-02 Dust collector is for fly ash silo

NEW EU #4: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500612
Units: Tons Material Handled
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Raw Material Transfer
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Raw material transfer
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

NEW EU #4: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER MEDIUM TEMPERATURE (180F
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 1.83 lb/hour 8.03 tons/year
Synthetically Limited? N
Range of Estimated Fugitive Emissions:
Emission Factor: 0.01
Emission Factor Units: GRAINS/DSCF
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D

Pollutant Comment:

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: FABRIC FILTER MEDIUM TEMPERATURE (180F
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions: 1.56 lb/hour 6.83 tons/year
Synthetically Limited? N
Range of Estimated Fugitive Emissions:
Emission Factor: 0.0085
Emission Factor Units: GRAINS/DSCF
Emission Factor Reference: BACT LIMIT
Emissions Method Code:
Calculation of Emissions: See Attachment D
Pollutant Comment: PM10 emissions estimated at 85% of PM emissions. BACT limit set accordingly.

NEW EU #4: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.01
Allowable Emission Unit: GRAINS PER DRY STANDARD CUBIC FOOT
Equivalent Allowable Emissions: 1.83 lb/hour 8.03 tons/year
Method of Compliance: VE in lieu of stack test
Comment/Description of Operating Method: PM tests not normally required. Use Method 5 if required.

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Basis for Allowable Emissions Code: RULE - EMISSIONS CAP REQUIRED BY RULE
Future Effective Date of Allowable Emissions:
Allowable Emissions: 0.0085
Allowable Emission Unit: GRAINS PER DRY STANDARD CUBIC FOOT
Equivalent Allowable Emissions: 1.56 lb/hour 6.83 tons/year
Method of Compliance: VE in lieu of stack test
Comment/Description of Operating Method: PM10 tests not normally required. Use Method 201 if required.

NEW EU #4: VISIBLE EMISSIONS INFORMATION

Visible Emissions Subtype: VE05
Basis for Allowable Opacity: RULE

Requested Allowable Opacity in Normal Conditions: 5
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment: VE limit is BACT

Visible Emissions Subtype: VE10
Basis for Allowable Opacity: RULE
Requested Allowable Opacity in Normal Conditions: 10
Requested Allowable Opacity in Exceptional Conditions:
Maximum Period of Excess Opacity Allowed:
Continuous Opacity Monitor Used: No
Compliance Test Method(s):
Visible Emissions Comment: Requirement of NESHAP. For NESHAP Method 9, test required initially & every 5 years. BACT limit is more stringent.

NEW EU #4: CONTINUOUS MONITOR INFORMATION

*** NO CONTINUOUS MONITOR INFORMATION FOUND FOR THIS EU ***

NEW EU #4: ADDITIONAL ITEMS

Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	Yes	Yes
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	Yes	Yes
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? NO Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN Previously submitted? NO Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes
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.)	Yes	Yes
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No

NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No
PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

NEW EU #4: ATTACHMENTS

Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
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))	No	Included in uploaded Attachment F	N/A	N/A
DETAILED DESCRIPTION OF CONTROL EQUIPMENT	Yes	Included in uploaded Attachment D		No
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.)	Yes	Included in uploaded Attachment E		No
IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Included in uploaded Attachment C		No
PROCESS FLOW DIAGRAM	Yes	Included in uploaded Attachment B		No

NEW EU #5: DESCRIPTION AND DETAIL INFORMATION

Regulated/Unregulated: NOT APPLICABLE
Type of EU: 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.
EU Description: Storage piles, paved and unpaved roads
EU Status: A - ACTIVE
Commence Construction Date:

Initial Startup Date:
EU Major Group SIC: 32 - STONE, CLAY, GLASS AND CONCRETE PRODUCTS
Acid Rain Unit:
Package Unit Manufacturer:
Generator Nameplate Rating:
EU Comment: Fugitive emission sources related to both new and old kiln systems

NEW EU #5: CONTROL EQUIPMENT/METHOD INFORMATION

Control Equipment/Method Name	Description
NO CONTROL EQUIPMENT	

NEW EU #5: OPERATING CAPACITY AND SCHEDULE

Maximum Process or Throughput Rate:
Maximum Process or Throughput Rate Units:
Maximum Production Rate:
Maximum Production Rate Units:
Maximum Heat Input Rate:
Maximum Incineration Rate:
Requested Maximum Operating Schedule: 24 hours/day 7 days/week 52 weeks/year 8760 hours/year
Operating Capacity and Schedule Comment:

NEW EU #5: POINT (STACK/VENT) INFORMATION

Identification of Point on Plot Plan or Flow Diagram? Storage Piles, Paved and Unpaved Roads
Emission Point Type Code: 4 - NO TRUE EMISSION POINT
Discharge Type Code: F - FUGITIVE EMISSIONS; NO STACK EXISTS
Stack Height:
Exit Diameter:
Exit Temperature:
Actual Volumetric Flow Rate:
Water Vapor:
Maximum Dry Standard Flow Rate:
Nonstack Emission Point Height: 0 feet
Emission Point UTM Coordinates:
Emission Point Latitude:
Emission Point Longitude:

Emission Point Comment:

NEW EU #5: SEGMENT (PROCESS/FUEL) INFORMATION

SCC Code: 30500607
Units: Tons Material Unloaded
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Raw Material Unloading
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type): Raw material unloading
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

SCC Code: 30500608
Units: Ton-Years Material Stored
Description 1: Industrial Processes
Description 2: Mineral Products
Description 3: Cement Manufacturing (Dry Process)
Description 4: Raw Material Piles
Is this a Valid Segment? YES
Segment Description (Process/Fuel Type):
Maximum Hourly Rate:
Maximum Annual Rate:
Estimated Annual Activity Factor:
Maximum % Sulfur:
Maximum % Ash:
Million Btu per SCC Unit:
Segment Comment:

NEW EU #5: POLLUTANT POTENTIAL/ESTIMATED EMISSIONS INFORMATION

Pollutant Code: PM
Pollutant Description: Particulate Matter - Total
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: NO CONTROL EQUIPMENT
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive Emissions: 44.18 tons/year
Emission Factor:
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference:

Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment:

Pollutant Code: PM10
Pollutant Description: Particulate Matter - PM10
Is this a Valid Pollutant? YES
Include in the Facility Emissions Cap? NO
Pollutant Regulatory Code: EL - EMISSION-LIMITED POLLUTANT
Primary Control Device: NO CONTROL EQUIPMENT
Secondary Control Device:
Total % Efficiency of Control:
Potential Emissions:
Synthetically Limited? Y
Range of Estimated Fugitive Emissions: 10.9 tons/year
Emission Factor:
Emission Factor Units: LB/TON PROCESSED
Emission Factor Reference:
Emissions Method Code: 3 - CALCULATED USING EMISSION FACTOR FROM AP-42/FIRE SYSTEM.
Calculation of Emissions: See Attachment D
Pollutant Comment:

NEW EU #5: POLLUTANT ALLOWABLE EMISSIONS INFORMATION

*** NO POLLUTANT ALLOWABLE EMISSIONS INFORMATION FOUND FOR THIS EU ***

NEW EU #5: VISIBLE EMISSIONS INFORMATION

*** NO VISIBLE EMISSIONS INFORMATION FOUND FOR THIS EU ***

NEW EU #5: CONTINUOUS MONITOR INFORMATION

*** NO CONTINUOUS MONITOR INFORMATION FOUND FOR THIS EU ***

NEW EU #5: ADDITIONAL ITEMS

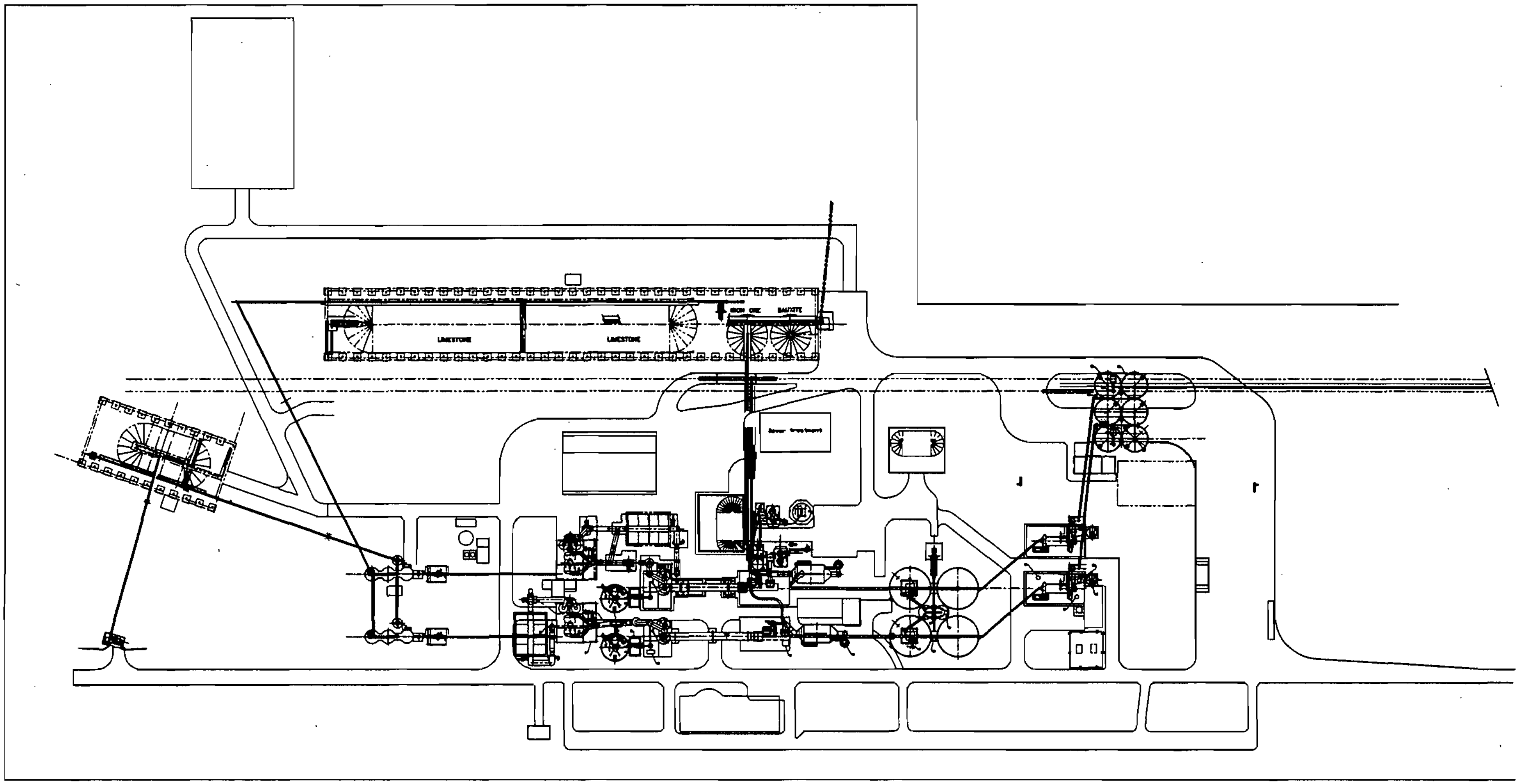
Description	Applicable?	Attachment?
PROCESS FLOW DIAGRAM Previously submitted? NO Submittal Date:	No	No
FUEL ANALYSIS OR SPECIFICATION Previously submitted? NO Submittal Date:	No	No
DETAILED DESCRIPTION OF CONTROL EQUIPMENT Previously submitted? NO Submittal Date:	No	No
DESCRIPTION OF STACK SAMPLING FACILITIES	No	No
PROCEDURES FOR STARTUP AND SHUTDOWN Previously submitted? NO Submittal Date:	No	No
OPERATION AND MAINTENANCE PLAN Previously submitted? NO Submittal Date:	No	No
COMPLIANCE DEMONSTRATION REPORTS/RECORDS Previously submitted? NO Submittal Date: Previously Submitted Test Date(s)/Pollutants Tested: To Be submitted? NO Submittal Date: To Be Submitted Test Date(s)/Pollutants Tested:	No	No
OTHER INFORMATION REQUIRED BY RULE OR STATUTE	No	No

IDENTIFICATION OF APPLICABLE REQUIREMENTS	Yes	Yes
COMPLIANCE ASSURANCE MONITORING PLAN	No	No
ALTERNATIVE METHODS OF OPERATION	No	No
ACID RAIN PART (FORM NO. 62-210.900(1)(a)) Previously submitted? NO Submittal Date:	No	No
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))	Yes	Yes
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.)	No	No
ALTERNATIVE MODES OF OPERATION (EMISSIONS TRADING)	No	No
REPOWERING EXTENSION PLAN (FORM NO. 62-210.900(1)(a)1.) Previously submitted? NO Submittal Date:	No	No
NEW UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)2.) Previously submitted? NO Submittal Date:	No	No
RETIRED UNIT EXEMPTION (FORM NO. 62-210.900(1)(a)3.) Previously submitted? NO Submittal Date:	No	No
PHASE II NOx COMPLIANCE PLAN (FORM NO. 62-210.900(1)(a)4. Previously submitted? NO Submittal Date:	No	No
PHASE II NOx AVERAGING PLAN (FORM NO. 62-210.900(1)(a)5.) Previously submitted? NO Submittal Date:	No	No
CERTIFICATE OF REPRESENTATION (EPA FORM NO. 7610-1)	No	No
OTHER EMISSIONS UNIT INFORMATION	No	No

NEW EU #5: ATTACHMENTS

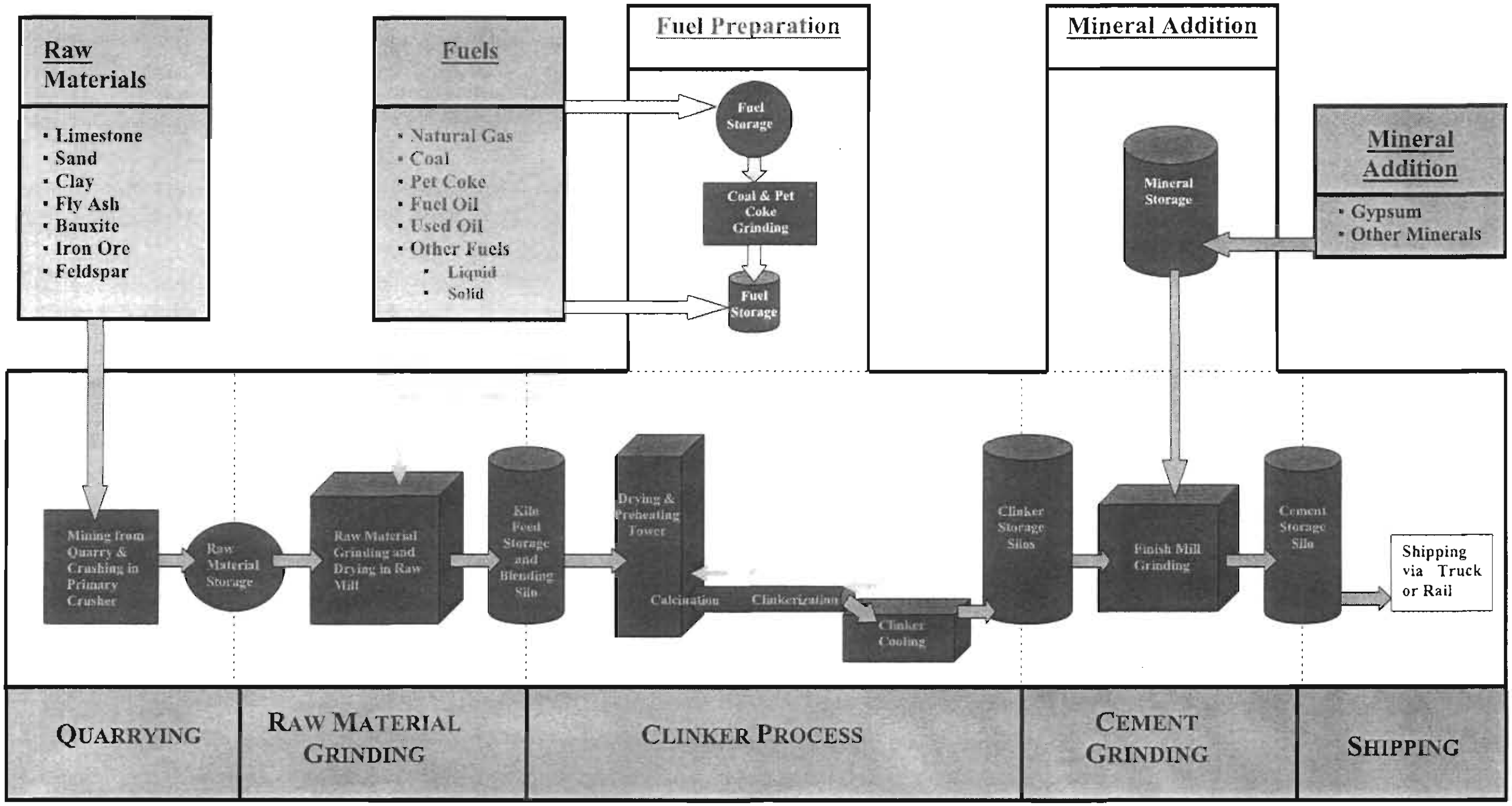
Description	Electronic?	Attachment Description	Electronic File Name	Uploaded?
CONTROL TECHNOLOGY REVIEW AND ANALYSIS (RULES 62-212.400(6) and 62-212.500(7), F.A.C.;40 CFR 63.43(d) and (e))	No	Included in uploaded Attachment F	N/A	N/A
IDENTIFICATION OF APPLICABLE REQUIREMENTS	No	Included in uploaded Attachment C	N/A	N/A

***** End of Application for Air Permit - Long Form *****
Printed on 2/18/2005



Attachment A - Facility Plot Plan

Attachment -B



CEMENT PROCESS FLOW & SUB-PROCESSES WITH SYSTEM BOUNDARIES

DWN: JH	*The Information contained herein is confidential & the property of SAC & not for publication.*	SAC
CHKD: JH		
APPD:		
Drawing Title: Cement Process Flow		
Ref	Drawing No: 110.100-001	Rev: A

REGULATORY ANALYSIS REPORT IN SUPPORT OF A MAJOR SOURCE AIR PERMIT APPLICATION

By

Environmental Quality Management, Inc.
Cedar Terrace Office Park, Suite 250
3325 Durham-Chapel Hill Boulevard
Durham, North Carolina 27707

PN 050430.0001.005

Suwannee American Cement Company
Suwannee County, Florida

February 18, 2005

CONTENTS

SECTION 1

PROJECT DESCRIPTION

The Suwannee American Cement Company, Inc. (SAC) plans to construct a new dry process preheater/precalciner Portland cement kiln system and associated equipment to be located at its existing cement plant near Branford, Florida. The existing plant is subject to a prevention of significant deterioration (PSD) permit originally issued by the Florida Department of Environmental Protection (DEP) on June 1, 2000. The new kiln system will result in increased throughput for the existing primary crusher, raw material, and coal handling and conveying systems and thus, certain existing throughput limits will need to be increased. The increased emissions of particulate matter (PM), PM less than 10 microns in diameter (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOC) will exceed the significant emission rates specified at FAC 62-212, Table 212.400-2. Because the Branford area remains in attainment with the National Ambient Air Quality Standards (NAAQS) for the above pollutants, the plant modification is subject to the requirements under Florida's PSD rules at FAC 62-212.400 for each of these pollutants. The potential emissions of the other pollutants in Table 212.400-2 will not be exceeded.

The new kiln system and associated equipment will be very similar in size and design to the existing systems, except that the clinker cooler gas will be vented through the raw mill and the main baghouse and stack, thus eliminating a major source of PM emissions at the plant. The new kiln system will have a capacity of 215 tons/h of material fed to the preheater (dry basis) and 126.8 tons/h of clinker production. The new finish mill will have a capacity of 175 tons/h of Portland cement production. Annual production will be 1,789,230 tons per year of material fed to the preheater (dry basis) and 1,055,467 tons per year of clinker (3043 tons/day). The new finish mill will result in an increase of 1,191,360 tons per year of Portland cement production. The raw materials and additives used in the new kiln system will be the same as are used or will be used in the existing kiln system, including the mercury content that complies with the current throughput limit. The raw materials include limestone (or other calcium carbonate sources), fly ash (or other alumina sources), sand (or other silica sources), and iron (or other iron sources). Up to 45 tons/h of fly ash may be injected into the calciner.

Fuels to be used in the pyroprocessing system are fuel oil, natural gas, coal, petroleum coke, and whole or chipped tires. Also, 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 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. The plant will also include a coal processing operation that will crush 150,000 tons of coal and petroleum coke annually (18 tons/h). The new equipment will include additional raw material storage bins, clinker storage silos, cement storage silos, and associated conveyor systems.

There will be a new diesel emergency generator set. The total amount of diesel fuel to be burned in the existing and new emergency generators will not exceed 32,000 gal/yr and thus they are exempt from permitting pursuant to 62.210.300(3)(a)20.

Emissions units addressed by this permitting action are:

EU ID	Description
001	Primary crusher and assoc. belt conveyors
003	Raw material processing – conveyor transfer points
009	Coal conveying equipment
New	Clinker and cement processing operations controlled by baghouse
New	New coal mill system controlled by baghouse
New	New in line kiln/raw mill/cooler controlled by baghouse – main stack
New	New raw material processing controlled by baghouses
New	Storage piles, paved and unpaved roads

The vendors for the new equipment have not yet been selected. Therefore, the application does not include detailed process flow diagrams (a simplified PFD is provided), information on process and control equipment manufacturers, continuous emission monitoring systems (CEMS), etc. To the extent requested by the DEP, this information will be provided 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.

SECTION 2

APPLICABLE REGULATIONS

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

The processing of limestone [crushers, screens, conveyor transfer points (except to a pile), and storage bins] from the quarry up to the storage bins just prior to the raw mill is subject to NSPS Subpart OOO (Nonmetallic Mineral Processing Plants). 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 0.031 gr/dscf.

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

2.2 National Emission Standards for Hazardous Air Pollutants (NESHAPs) – 40 CFR Part 63

SAC stipulates that it is a major source of hazardous air pollutants (HAPs) and therefore subject to NESHAPs Subpart LLL (Portland Cement Manufacturing Plants). The kiln is subject to emission limits for particulate matter (PM) (0.3 lb/ton of dry feed) and dioxins and furans (D/F) and an opacity limit of 20 percent. The clinker cooler stack has been eliminated; thus, the cooler emission limits are not applicable. All other stack and fugitive process sources, except those subject to the NSPS noted above, are subject to an opacity limit of 10 percent. There is no separate raw material dryer subject to the total hydrocarbon standard for greenfield dryers. SAC must be in compliance with these limits upon startup of the new equipment.

As required by 40 CFR 63.1350(a) and 63.6(e)(3), SAC has submitted to the DEP a written operation and maintenance (O&M) plan and a startup, shutdown, and malfunction plan for the existing facility. Among other things, these plans 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. These plans will generally apply to the new equipment as well as the existing equipment. The plans will be modified to include the specifics of the new equipment prior to startup and operation.

2.3 New Source Review (NSR)

The existing SAC plant is considered a major facility under 62.212, FAC. For modifications to a major facility 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, 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 soils, vegetation, visibility and secondary growth).

These analyses are contained in separate reports attached to the application.

As set forth in a March 1, 2000 DEP policy memorandum, Florida's air toxics program is based on the application of Part 61 and 63 NESHAP rules 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.

2.4 Florida Emission Limiting Rules

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

296.320(a) – Process Weight Limits
296.320(b) – General Visible Emissions Standard
296.320(c) – Unconfined Emissions of Particulate Matter
296.407 – Portland Cement Plants

SECTION 3

REQUESTED PERMIT LIMITS

The permit limits, including the regulatory basis and the associated testing and monitoring requirements, being requested by SAC are discussed below. Where there are multiple regulatory bases (e.g., BACT, NESHAPS, PSD increment compliance), the most restrictive limits that will ensure compliance with other applicable requirements are recommended. SAC requests elimination of multiple redundant forms of emission limits and throughput limits. The kiln emission limits below are applicable for all combinations of fuel to be burned.

3.1 Kiln/Raw Mill/Cooler Emission Limits

3.1.1 PM

0.13 lb/ton dry preheater feed as determined by annual Method 5 test (BACT).

3.1.2 PM_{10}

0.11 lb/ton dry preheater feed as determined by annual Method 201 test (BACT).

3.1.3 Opacity

Ten percent as measured by COM (BACT).

3.1.4 CO

4.0 lb/ton of clinker as determined by biennial Method 10 test (BACT). This will ensure compliance with the NAAQS for CO.

3.1.5 VOC

0.12 lb/ton of clinker, 30-day rolling average, as determined by CEM meeting Performance Specification 4A (BACT).

3.1.6 SO_2

0.27 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 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. The modeling analysis using longer term average emissions demonstrated that the Suwannee emissions impacts (existing and proposed) were well below all air quality constraints, including Class I increments, visibility, and sulfate/nitrate deposition. The SO_2 emissions are so low that the BACT limit is easily more controlling than air quality considerations and thus a separate short-term lb/h limit is unwarranted.

3.1.7 NO_x

2.0 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 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 1- and 8-h ozone concentrations). Averaging times for NO_2 air quality concentrations (NAAQS and PSD increments) are based on annual concentrations.

Because of the uncertainty and lack of experience with SNCR on cement kilns, SAC requests that the above emission limit exclude periods of startup, shutdown, and malfunction which are properly justified as such and reported to the DEP. SAC also requests that for the first year of operation, the emission limit be set at 3.0 lb/ton of clinker to allow shakedown and optimization of the SNCR system.

3.1.8 Dioxins/Furans

0.4 ng/dscm (TEQ) corrected to 7 percent oxygen as measured by Method 23 initially and every 30 months (NESHAP).

3.2 Miscellaneous Baghouses

3.2.1 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).

3.2.2 PM_{10}

0.0085 gr/dscf as determined by initial Method 201 test on selected baghouses (BACT).

3.2.3 Opacity

Five percent as determined by initial and every 5 year Method 9 test and monitoring scheme under 40 CFR 63.1450 (BACT).

3.3 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 is controlled by baghouses permitted at 0.01 gr/dscf and 8760 h/yr. This defines the PTE for these sources and thus a cement throughput limit is not necessary or appropriate. The requested throughput limits are as follows:

Primary crusher and associated conveyors: 3,450,000 tons/yr, rolling 12-month average

Kiln and cooler system: 1,055,467 tons/yr clinker, rolling 12-month average; 126.7 tons/h clinker. The feed to clinker ratio is relatively fixed within a narrow range; separate kiln feed limits would be redundant. Mercury compounds, as Hg, in raw mill feed and fuels, limited to 122 lb per 12 consecutive months.

Coal mill: No throughput limit. PTE is fixed by grain loading and hours. Coal handling fugitives are very small (PM = 0.06 tons/yr) and do not warrant a throughput limit.

Plantwide Total Emissions										
EU No.	EU Description	PM tons/yr	PM_{10} 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
	Existing Point Sources									
2-1	Raw Material Processing	6.28	5.34							
4-1	Kiln System	92.81	78.53	113.33	1,217.28	1,511.10	50.37	12.23	0.031	0.049
5-1	Clinker Cooler	49.98	42.84							
6-1	Clinker & Cement Processing	65.68	55.83							
8-1	Coal Mill System	8.23	7.00							
10-1	Emergency Generator	0.07	0.06	0.55	2.31	0.43	0.08			
	Contemporaneous Point Sources									
2-1	Raw Material Processing	1.75	1.49							
	New Point Sources									
2-2	Raw Material Processing	8.03	6.83							
4-2	Kiln System	116.30	98.41	142.49	1,055.47	2,110.93	63.33	15.38	0.040	0.061
6-2	Clinker & Cement Processing	65.11	55.34							
8-2	Coal Mill System	8.23	7.00							
10-2	Emergency Generator	0.07	0.06	0.55	2.31	0.43	0.08			
	Modified Fugitive Sources									
1	Primary Crushing & Stone Conveyors	5.77	2.67							
3	Raw Material Conveying	0.91	0.43							
9	Coal Conveying	0.06	0.03							
11	Storage Piles	5.07	2.52							
12	Plant Roads - Paved	30.37	5.89							
13	Quarry Roads - Unpaved	8.74	2.49							
	Total	**473.47**	**372.74**	**256.92**	**2,277.37**	**3,622.90**	**113.86**	**27.610**	**0.071**	**0.109**

Throughput Data

Material	Existing Throughput (tons/yr)	Proposed Throughput (tons/yr)	Increase (tons/yr)	Existing Rate (tons/hr)	Proposed Rate (tons/hr)	Increase (tons/hr)	Comments
Limestone crushed	1,679,000	3,450,000	1,771,000	NA	NA	NA	
Base Rock	44,384	100,000	55,616	NA	NA	NA	Quarry sales
Limestone - raw material	1,634,616	3,350,000	1,715,384	NA	NA	NA	
Sand	31,956	72,000	40,044	NA	NA	NA	
Iron Ore	31,956	72,000	40,044	NA	NA	NA	
Fly Ash	199,728	450,000	250,272	NA	NA	NA	
Raw Material Total	1,898,257	3,944,000	2,045,743	NA	NA	NA	
Coal Total	127,896	277,896	150,000	NA	NA	NA	
Coal Auxillary Storage	19,184	37,500	18,316	NA	NA	NA	15% of coal
Raw Mill - Kiln 1	1,352,728	1,352,728	-	NA	NA	NA	
Raw Mill - Kiln 2	0	1,695,060	1,695,060	NA	NA	NA	
Kiln 1 Preheater Feed	1,427,880	1,427,880	-	178	178	-	Includes recycle
Kiln 2 Preheater Feed	0	1,789,230	1,789,230	0	215	215	Includes recycle
Total Kiln Feed	1,427,880	3,217,110	1,789,230	178	393	215	
Clinker - Kiln 1	839,500	839,500	-	105	105	-	
Clinker - Kiln 2	0	1,055,467	1,055,467	0	126.8	126.8	
Total Clinker	839,500	1,894,967	1,055,467	105	231.8	126.8	
Gypsum	75,000	150,000	75,000	NA	NA	NA	
Cement - Mill 1	1,191,360	1,191,360	-	150	150	-	
Cement - Mill 2	0	1,191,360	1,191,360	0	175	175	
Total Cement	1,191,360	2,382,720	1,191,360	150	325	175	

Existing PM Emission Points

EU No.	Equip. No.	Description	Flow ACFM	Temp. deg F	Moisture %	Flow DSCFM	Operating Hours	PM gr/dscf	PM-10 gr/dscf	PM lb/hr	PM-10 lb/hr	PM tons/yr	PM-10 tons/yr	Stack Parameters >> Height ft	Diam. ft	Velocity fpm	Orientation
2	E28-01	Aeropol @ Homogenizing Silo	3,000	300	2%	2,043	8,760	0.01	0.0085	0.18	0.15	0.77	0.65	56	1.0	3820	H
2	E34-01	Off Spec. Feed Handling	2,000	300	2%	1,362	8,760	0.01	0.0085	0.12	0.10	0.51	0.43	50	1.0	2546	H
2	G07-01	Homogenizing Silo Inlet	15,000	200	2%	11,760	8,760	0.01	0.0085	1.01	0.86	4.42	3.75	242	2.2	3946	H
2	H08-01	Poldos Homogenizing Silo Outlet	2,000	200	2%	1,568	8,760	0.01	0.0085	0.13	0.11	0.59	0.50	50	1.0	2546	H
2	**Subtotal Raw Material Processing**		**22,000**			**16,732**				**1.43**	**1.22**	**6.28**	**5.34**				
4	E21-01	Kiln/Raw Mill Baghouse Stack	220,000	215	15%	146,276	8,760	N/A	N/A	23.1	19.6	92.81	78.53	315	9.42	3157	V
4	**Subtotal Kiln System**		**220,000**			**146,276**				**23.14**	**19.58**	**92.81**	**78.53**				
5	K15-01	Clinker Cooler ESP Stack	160,000	300	10%	100,042	8,760	N/A	N/A	12.5	10.7	49.98	42.84	214	7.0	4158	V
5	**Subtotal Clinker Cooler**		**160,000**			**100,042**				**12.46**	**10.68**	**49.98**	**42.84**				
6	L03-01	Clinker Cooler Con./Breaker	3,000	300	2%	2,043	8,760	0.01	0.0085	0.18	0.15	0.77	0.65	37	1.0	3820	H
6	L06-01	Clinker Silo, Inlet	11,390	300	2%	7,755	8,760	0.01	0.0085	0.66	0.56	2.91	2.47	192	1.1	11985	H
6	L25-01	Relocated/Mod (see New Points)	0	90	2%	0	8,760	0.01	0.0085	0.00	0.00	0.00	0.00	82	1.0	0	H
6	M08-01	Clinker Silo Outlet Conveyor	6,000	212	2%	4,620	8,760	0.01	0.0085	0.40	0.34	1.73	1.47	19	1.1	6314	H
6	M09-01	Relocated/Mod (see New Points)	0	90	2%	0	8,760	0.01	0.0085	0.00	0.00	0.00	0.00	10	1.1	0	H
6	N09-01	Finish Mill BH Sepol No.1 (W)	128,600	198	3%	100,097	8,760	0.01	0.0085	8.58	7.29	37.58	31.94	175	4.0	10234	V
6	N12-01	Finish Mill BH-Mill No.2 (E)	35,000	198	4.6%	26,793	8,760	0.01	0.0085	2.30	1.95	10.06	8.55	131	3.0	4951	V
6	N36-01	Fringe Cement Bin	4,000	130	2%	3,508	8,760	0.01	0.0085	0.30	0.26	1.32	1.12	65	1.4	2598	H
6	N91-01	Finish Mill Baghouse No. 3 (S)	6,000	200	2%	4,704	8,760	0.01	0.0085	0.40	0.34	1.77	1.50	47	1.4	3898	H
6	P03-01	Cement Transport Conveyor	3,000	130	2%	2,631	8,760	0.01	0.0085	0.23	0.19	0.99	0.84	54	1.0	3820	H
6	P11-01	Cement Silo Input	15,000	130	2%	13,155	8,760	0.01	0.0085	1.13	0.96	4.94	4.20	195	2.0	4775	H
6	Q14-01	Truck Load-out No. 1 (W)	3,000	130	2%	2,631	8,760	0.01	0.0085	0.23	0.19	0.99	0.84	29	1.0	3820	H
6	Q17-01	Truck Load-out No. 2 (E)	3,000	130	2%	2,631	8,760	0.01	0.0085	0.23	0.19	0.99	0.84	39	1.0	3820	H
6	Q24-01	Railcar Load-out	5,000	130	2%	4,385	8,760	0.01	0.0085	0.38	0.32	1.65	1.40	57	1.0	6366	H
6	**Subtotal Clinker & Cement Processing**		**222,990**			**174,953**				**15.00**	**12.75**	**65.68**	**55.83**				
8	S17-01	Coal Mill East/West BH	25,000	150	6.5%	20,233	8,760	0.01	0.0085	1.73	1.47	7.60	6.46	100	3.0	7074	V
8	S21-01	Pulverized Coal Bin	2,000	150	2%	1,697	8,760	0.01	0.0085	0.15	0.12	0.64	0.54	60	1.0	2546	H
8	**Subtotal Coal System**		**27,000**			**21,929**				**1.88**	**1.60**	**8.23**	**7.00**				
	Total Point Sources									**53.91**	**45.82**	**222.98**	**189.54**				

Permitted New PM Emission Points

EU No.	Equip. No.	Description	Flow ACFM	Temp. deg F	Moisture %	Flow DSCFM	Operating Hours	PM gr/dscf	PM-10 gr/dscf	PM lb/hr	PM-10 lb/hr	PM tons/yr	PM-10 tons/yr	Stack Parameters >> Height ft	Diam. ft	Velocity fpm	Orien-tation
2	H08A-01	Hydrated Lime Silo*	2,700	140	2%	2,328	8,760	0.01	0.0085	0.20	0.17	0.87	0.74	35	1.2	2387	H
2	U05-01	Fly Ash Silo*	2,700	140	2%	2,328	8,760	0.01	0.0085	0.20	0.17	0.87	0.74	120	1.2	2387	H
2	**Subtotal Raw Material Processing**		**5,400**			**4,657**				**0.40**	**0.34**	**1.75**	**1.49**				
	Total Point Sources									**0.40**	**0.34**	**1.75**	**1.49**				

* Source is currently permitted but not yet constructed (contemporaneous emission increase)

Proposed New PM Emission Points

EU No.	Equip. No.	Description	Flow ACFM	Temp. deg F	Moisture %	Flow DSCFM	Operating Hours	PM gr/dscf	PM-10 gr/dscf	PM lb/hr	PM-10 lb/hr	PM tons/yr	PM-10 tons/yr	Stack Parameters >> Height ft	Diam. ft	Velocity fpm	Orien-tation
2	E28-02	Raw Mill - Aeropol	3,000	300	2%	2,043	8,760	0.01	0.0085	0.18	0.15	0.77	0.65	56	1.0	3820	H
2	E34-02	Off Spec. Feed Handling	2,000	300	2%	1,362	8,760	0.01	0.0085	0.12	0.10	0.51	0.43	50	1.0	2546	H
2	G07-02	Homogenizing Silo Inlet	15,000	200	2%	11,760	8,760	0.01	0.0085	1.01	0.86	4.42	3.75	242	2.2	3946	H
2	H08-02	Poldos Homogenizing Silo Outlet	2,000	200	2%	1,568	8,760	0.01	0.0085	0.13	0.11	0.59	0.50	50	1.0	2546	H
2	H08A-02	Hydrated Lime Silo	2,700	140	2%	2,328	8,760	0.01	0.0085	0.20	0.17	0.87	0.74	35	1.2	2387	H
2	U05-02	Fly Ash Silo	2,700	140	2%	2,328	8,760	0.01	0.0085	0.20	0.17	0.87	0.74	120	1.2	2387	H
2	**Subtotal**	**Raw Material Processing**	**27,400**			**21,389**				**1.83**	**1.56**	**8.03**	**6.83**				
4	E21-02	Kiln/Raw Mill Baghouse Stack	333,000	215	15%	221,408	8,760	N/A	N/A	28.0	23.7	116.30	98.41	315	9.42	4778	V
4	**Subtotal**	**Kiln System**	**333,000**			**221,408**				**27.95**	**23.65**	**116.30**	**98.41**				
6	L03-02	Clinker Pan Conveyor	3,000	300	2%	2,043	8,760	0.01	0.0085	0.18	0.15	0.77	0.65	37	1.0	3820	H
6	L06-02	Clinker Silo Inlet	11,390	300	2%	7,755	8,760	0.01	0.0085	0.66	0.56	2.91	2.47	192	1.1	11985	H
6	L25-02	Gyp/OS Clinker Transport (Relocated	6,000	90	2%	5,645	8,760	0.01	0.0085	0.48	0.41	2.12	1.80	82	1.0	7639	H
6	M08-02	Clinker Silo Outlet Conveyor	6,000	212	2%	4,620	8,760	0.01	0.0085	0.40	0.34	1.73	1.47	19	1.1	6314	H
6	M09-02	Gyp/OS Clinker Silo Outlet (Relocate	4,500	90	2%	4,234	8,760	0.01	0.0085	0.36	0.31	1.59	1.35	10	1.1	4735	H
6	N09-02	Finish Mill Separator	128,600	198	3%	100,097	8,760	0.01	0.0085	8.58	7.29	37.58	31.94	175	4.0	10234	V
6	N12-02	Finish Mill BH	35,000	198	4.6%	26,793	8,760	0.01	0.0085	2.30	1.95	10.06	8.55	175	3.0	4951	V
6	N36-02	Fringe Cement Bin	4,000	130	2%	3,508	8,760	0.01	0.0085	0.30	0.26	1.32	1.12	65	1.4	2598	H
6	N91-02	Finish Mill Baghouse No. 3 (S)	6,000	200	2%	4,704	8,760	0.01	0.0085	0.40	0.34	1.77	1.50	47	1.4	3898	H
6	P03-02	Cement Transport Conveyor	3,000	130	2%	2,631	8,760	0.01	0.0085	0.23	0.19	0.99	0.84	54	1.0	3820	H
6	P11-02	Cement Silos	10,000	130	2%	8,770	8,760	0.01	0.0085	0.75	0.64	3.29	2.80	195	2.0	3183	H
6	Q17-02	Truck Load-out No. 3	3,000	130	2%	2,631	8,760	0.01	0.0085	0.23	0.19	0.99	0.84	39	1.0	3820	H
6	**Subtotal**	**Clinker & Cement Processing**	**220,490**			**173,430**				**14.87**	**12.64**	**65.11**	**55.34**				
8	S17-02	Coal Mill No. 1 & 2 BH	25,000	150	6.5%	20,233	8,760	0.01	0.0085	1.73	1.47	7.60	6.46	100	3.0	7074	V
8	S21-02	Pulverized Coal Bin	2,000	150	2%	1,697	8,760	0.01	0.0085	0.15	0.12	0.64	0.54	60	1.0	2546	H
8	**Subtotal**	**Coal System**	**27,000**			**21,929**				**1.88**	**1.60**	**8.23**	**7.00**				
	Total Point Sources									**46.53**	**39.44**	**197.67**	**167.58**				

Kiln System Emissions

Hourly Emissions:

EU No.	EU Description	Kiln Feed lbs/hr	Clinker lbs/hr	PM lbs/hr	PM_{10} lbs/hr	SO2 lbs/hr	NO_X lbs/hr	CO lbs/hr	VOC lbs/hr	HCl lbs/hr	Lead lbs/hr	Mercury lbs/hr
4-1	Existing Kiln System	178	105	23.14	19.58	28.35	304.50	378.00	12.60	6.10	0.008	0.012
4-2	New Kiln System	215	126.8	27.95	23.65	34.24	253.60	507.20	15.22	7.37	0.010	0.015
	Total	393	232	51.09	43.23	62.59	558.10	885.20	27.82	13.47	0.017	0.027

Annual Emissions:

EU No.	EU Description	Kiln Feed tons/yr	Clinker tons/yr	PM tons/yr	PM_{10} tons/yr	SO2 tons/yr	NO_X tons/yr	CO tons/yr	VOC tons/yr	HCl tons/yr	Lead tons/yr	Mercury tons/yr
4-1	Existing Kiln System	1,427,880	839,500	92.81	78.53	113.33	1,217.28	1,511.10	50.37	12.23	0.031	0.049
4-2	New Kiln System	1,789,230	1,055,467	116.30	98.41	142.49	1,055.47	2,110.93	63.33	15.38	0.040	0.061
	Total	3,217,110	1,894,967	209.11	176.94	255.82	2,272.74	3,622.03	113.70	27.61	0.071	0.109

Emissions Basis:

Existing Kiln

Pollutant	Emission Factor	Emission Factor Units	Source of Emission Factor
PM	0.13	lb/ton dry feed	Existing permit/BACT
PM_{10}	0.11	lb/ton dry feed	Existing permit/BACT
SO_2	0.27	lb/ton clinker	Existing permit/BACT
NO_X	2.9	lb/ton clinker	Existing permit/BACT
CO	3.6	lb/ton clinker	Existing permit/BACT
VOC	0.12	lb/ton clinker	Existing permit/BACT
HCl (short term)	0.0581	lb/ton clinker	Stack test (mill off)
HCl (annual)	0.0291	lb/ton clinker	Stack test (80% mill on))
Lead	7.50E-05	lb/ton clinker	AP-42 Table 11.6-9
Mercury	1.16E-04	lb/ton clinker	Existing permit

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
SO_2	0.27	lb/ton clinker	Proposed BACT
NO_X	2.0	lb/ton clinker	Proposed BACT
CO	4.0	lb/ton clinker	Proposed BACT
VOC	0.12	lb/ton clinker	Proposed BACT
HCl (short term)	0.0581	lb/ton clinker	Stack test (mill off)
HCl (annual)	0.0291	lb/ton clinker	Stack test (80% mill on))
Lead	7.50E-05	lb/ton clinker	AP-42 Table 11.6-9
Mercury	1.16E-04	lb/ton clinker	Existing permit

Clinker Cooler Emissions

EU No.	EU Description	Kiln Feed lbs/hr	Clinker lbs/hr	Kiln Feed tons/yr	Clinker tons/yr	PM lbs/hr	PM10 lbs/hr	PM tons/yr	PM10 tons/yr
5-1	Existing Clinker Cooler	178	105	1,427,880	839,500	12.46	10.68	49.98	42.84
N/A	New Clinker Cooler	215	126.8	1,789,230	1,055,467	0.00	0.00	0.00	0.00
	Total	393	232	3,217,110	1,894,967	12.46	10.68	49.98	42.84

Emissions Basis: **Existing Cooler**

Pollutant	Emission Factor	Emission Factor Units	Source of Emission Factor
PM	0.07	lb/ton dry feed	Existing permit/BACT
PM10	0.06	lb/ton dry feed	Existing permit/BACT

Note: Clinker cooler gases for the new kiln system will be vented through the raw mills and main kiln stack.

Emergency Generator Emissions

Hourly Emissions:

EU No.	EU Description	Size	Fuel Rate gal/hr	Heat Input MMBtu/hr	Output hp-hr	PM lbs/hr	PM_{10} lbs/hr	SO2 lbs/hr	NO_X lbs/hr	CO lbs/hr	VOC lbs/hr
10-1	Existing Generator	750 kW	54.8	7.51	1,006	0.48	0.43	3.79	15.90	2.97	0.55
10-2	New Generator	750 kW	54.8	7.51	1,006	0.48	0.43	3.79	15.90	2.97	0.55
	Total		109.6	15.02	2,012	0.95	0.86	7.58	31.80	5.94	1.11

Annual Emissions:

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	SO2 tons/yr	NO_X tons/yr	CO tons/yr	VOC tons/yr
10-1	Existing Generator	291	15,947	2,185	292,673	0.07	0.06	0.55	2.31	0.43	0.08
10-2	New Generator	291	15,947	2,185	292,673	0.07	0.06	0.55	2.31	0.43	0.08
	Total	582	31,894	4,369	585,347	0.14	0.13	1.10	4.63	0.86	0.16

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:

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
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

Material Conveying & Processing - Fugitive Emissions

Source Number	Description	Material	Material Information: Annual Qty (ton/yr)	Material Information: Moisture Content (%)	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)	Hourly PM Emissions (lb/hr)	Hourly PM10 Emissions (lb/hr)
FQ1	**Quarry Crusher Area**													
	Loader to Crusher	Limestone	3,450,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.28	0.47	0.13	0.06	0.03
	Primary Crusher Operation	Limestone	3,450,000	17	1.20E-03	AP-42 Table 11.19.2-2, 8/0	1			2.07	0.45	0.93	0.47	0.21
	Conveyors B01 thru B08	Limestone	3,450,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	8			2.25	0.47	1.06	0.51	0.24
								Total		**4.60**		**2.12**	**1.05**	**0.48**
FQ2	**Quarry Conveyors**													
	B08 to B20	Limestone	3,450,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.28	0.47	0.13	0.06	0.03
	B20 to B21	Limestone	3,450,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.28	0.47	0.13	0.06	0.03
	B21 to B22	Limestone	3,450,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.28	0.47	0.13	0.06	0.03
	B22 to B24[2]	Base Rock	100,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.01	0.47	0.00	0.00	0.00
	B24 to B27[2]	Base Rock	100,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.01	0.47	0.00	0.00	0.00
	B27 to Radial Stacker[2]	Base Rock	100,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.01	0.47	0.00	0.00	0.00
	B22 to B40	Limestone	3,350,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1			0.27	0.47	0.13	0.06	0.03
	B40 to C01	Limestone	3,350,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.01	0.01	0.00
								Total		**1.17**		**0.55**	**0.27**	**0.13**
FR1	**Raw Material Storage Building**													
	C01 to C02-01 (to piles)	Limestone	3,350,000	17	1.63E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.01	0.01	0.00
	Piles to reclaim belts	Limestone	3,350,000	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.23	0.47	0.11	0.05	0.02
	Reclaim belts to D01-01	Limestone	3,350,000	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.23	0.47	0.11	0.05	0.02
	Loader to Hopper	Iron Ore	72,000	6.5	6.27E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.01	0.47	0.00	0.00	0.00
	Loader to Hopper	Sand	72,000	16	1.78E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Hopper belt D00-01 to D01-01	Iron Ore, Sand	144,000	11.25	2.91E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D01-01 to D02-01 & D02-02	LS, Iron, Sand	3,494,000	10.1	3.40E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.06	0.47	0.03	0.01	0.01
								Total		**0.56**		**0.26**	**0.13**	**0.06**

Material Conveying & Processing - Fugitive Emissions

Source Number	Description	Material	Material Information: Annual Qty (ton/yr)	Material Information: Moisture Content (%)	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)	Hourly PM Emissions (lb/hr)	Hourly PM10 Emissions (lb/hr)
FR2	**Fly Ash Storage Building**													
	Truck to Hopper	Fly Ash	450,000	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1			0.03	0.47	0.01	0.01	0.00
	Hopper belt C12-01 to C13-01	Fly Ash	450,000	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	C13-01 to C15-01 (to pile)	Fly Ash	450,000	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.01	0.47	0.00	0.00	0.00
	Pile to reclaim	Fly Ash	450,000	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.01	0.47	0.00	0.00	0.00
	Reclaim to D51-01	Fly Ash	450,000	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
								Total		0.05		0.02	0.01	0.01
FR3A	**Raw Storage Bins (Existing)**													
	D02-01 to Limestone Bin 01	Limestone	1,634,616	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.01	0.01	0.00
	D02-01 to D03-01	Iron Ore, Sand	63,913	11.25	2.91E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D03-01 to Sand Bin 01	Sand	31,956	16	1.78E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D03-01 to Iron Ore Bin 01	Iron Ore	31,956	6.5	6.27E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D51-01 to Fly Ash Bin 01	Fly Ash	199,728	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Limestone Feeder to D09-01	Limestone	1,634,616	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.01	0.01	0.00
	Sand Feeder to D13-01	Sand	31,956	16	1.78E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Iron Ore Feeder to D40-01	Iron Ore	31,956	6.5	6.27E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Fly Ash Feeder to D40-01	Fly Ash	199,728	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D40-01 to D41-01	Raw Mix	1,898,257	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.02	0.01	0.00
	D41-01 to Raw Mill 01	Raw Mix	1,898,257	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.02	0.01	0.00
								Total		0.13		0.06	0.03	0.01
FR3B	**Raw Storage Bins (New)**													
	D02-02 to Limestone Bin 02	Limestone	1,715,384	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.01	0.01	0.00
	D02-02 to D03-02	Iron Ore, Sand	80,087	11.25	2.91E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D03-02 to Sand Bin 02	Sand	40,044	16	1.78E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D03-02 to Iron Ore Bin 02	Iron Ore	40,044	6.5	6.27E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D51-02 to Fly Ash Bin 02	Fly Ash	250,272	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Limestone Feeder to D09-02	Limestone	1,715,384	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.03	0.47	0.01	0.01	0.00
	Sand Feeder to D13-02	Sand	40,044	16	1.78E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Iron Ore Feeder to D40-02	Iron Ore	40,044	6.5	6.27E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Fly Ash Feeder to D40-02	Fly Ash	250,272	21.5	1.17E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	D40-01 to D41-02	Raw Mix	2,045,743	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.04	0.47	0.02	0.01	0.00
	D41-01 to Raw Mill 02	Raw Mix	2,045,743	10	3.43E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.04	0.47	0.02	0.01	0.00
								Total		0.14		0.06	0.03	0.01

Material Conveying & Processing - Fugitive Emissions

Source Number	Description	Material	Material Information: Annual Qty (ton/yr)	Material Information: Moisture Content (%)	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)	Hourly PM Emissions (lb/hr)	Hourly PM10 Emissions (lb/hr)
FR4	**Gypsum Transfer**													
	Loader to Hopper	Gypsum	150,000	8.5	4.31E-04	AP-42 Section 13.2.4, 1/95	1			0.03	0.47	0.02	0.01	0.00
	Hopper Belt to Elevator	Gypsum	150,000	8.5	4.31E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
								Total		**0.04**		**0.02**	**0.01**	**0.00**
FF1	**Coal Handling**													
	Truck to Hopper	Coal	277,896	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	60%	Enclosure	0.03	0.47	0.01	0.01	0.00
	Hopper Belt S02-01 to S03-10	Coal	277,896	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.01	0.47	0.00	0.00	0.00
	Loader to Hopper (to S03-10)	Coal	37,500	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1			0.01	0.47	0.00	0.00	0.00
	S03-10 to Elevator S05-01	Coal	315,396	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.01	0.47	0.00	0.00	0.00
	Elev S05-01 to Coal Bins 01	Coal	127,896	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Elev S05-01 to Coal Conv 02	Coal	150,000	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
	Coal Conv 02 to Coal Bins 02	Coal	150,000	8	4.69E-04	AP-42 Section 13.2.4, 1/95	1	90%	Enclosure	0.00	0.47	0.00	0.00	0.00
								Total		**0.06**		**0.03**	**0.01**	**0.01**
								Total		**6.74**		**3.13**	**1.54**	**0.71**

Notes:

[1] 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

[2] Base rock conveyors and stacker only operate when limestone for cement is not being processed

Storage Piles - Fugitive Emissions

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)
SP1	Stone Pile	Limestone	3.0	365	3.9	17	3,450,000	6.4	10.18	129	0	1.63E-04	0.28	1.65	7.72E-05	0.13	0.82
SP2	Base Rock Pile	Limestone	3.0	365	3.9	17	100,000	6.4	10.18	129	0	1.63E-04	0.01	1.65	7.72E-05	0.00	0.82
SP3	Limestone Storage	Limestone	2.0	365	3.9	17	3,350,000	6.4	10.18	0	60	1.63E-04	0.11	0.68	7.72E-05	0.05	0.34
SP4	Sand Storage	Sand	0.2	365	2.6	16	72,000	6.4	10.18	0	60	1.78E-04	0.00	0.05	8.40E-05	0.00	0.02
SP5	Iron Ore Storage	Iron Ore	0.2	365	3.8	6.5	72,000	6.4	10.18	0	60	6.27E-04	0.01	0.07	2.96E-04	0.00	0.03
SP6	Ash Storage	Fly Ash	0.5	365	8.0	21.5	450,000	6.4	10.18	0	60	1.17E-04	0.01	0.35	5.55E-05	0.00	0.17
SP7	Gypsum Storage	Gypsum	0.2	365	3.9	8.5	150,000	6.4	10.18	0	60	4.31E-04	0.01	0.07	2.04E-04	0.01	0.03
SP8	Coal Storage	Coal	0.3	365	4.6	8	37,500	6.4	10.18	0	60	4.69E-04	0.00	0.12	2.22E-04	0.00	0.06
												TOTALS	0.44	4.63		0.21	2.31

NOTES: 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

Storage Piles - Fugitive Emissio

ID NO.	Description	Material	TSP Total Emissions (T/yr)	PM10 Total Emissions (T/yr)	TSP Hourly Emissions (lb/hr)	PM10 Hourly Emissions (lb/hr)
SP1	Stone Pile	Limestone	1.93	0.96	0.441	0.219
SP2	Base Rock Pile	Limestone	1.66	0.83	0.378	0.189
SP3	Limestone Storage	Limestone	0.79	0.39	0.180	0.089
SP4	Sand Storage	Sand	0.05	0.02	0.011	0.005
SP5	Iron Ore Storage	Iron Ore	0.08	0.04	0.017	0.009
SP6	Ash Storage	Fly Ash	0.36	0.18	0.082	0.041
SP7	Gypsum Storage	Gypsum	0.08	0.04	0.018	0.009
SP8	Coal Storage	Coal	0.12	0.06	0.028	0.014
			5.07	**2.52**	**1.16**	**0.58**

NOTES:

Paved Road Emission Summary

Segment No.	Segment Length (mi)	Silt Loading (g/m2)	Material Trips (#/yr)	Total Mileage (Mi/yr)	Maximum Annual Emissions 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)
1A	0.42	0.15	184,826	77,627	0.27	0.05	10.30	2.00	2.352	0.456
1	0.42	0.15	184,826	77,627	0.27	0.05	10.30	2.00	2.352	0.456
2	0.03	0.15	59,975	3,599	0.08	0.01	0.14	0.03	0.032	0.006
3	0.16	0.15	59,975	12,476	0.13	0.03	0.84	0.16	0.191	0.037
4	0.21	0.15	41,975	8,815	0.01	0.00	0.03	0.00	0.006	0.001
5	0.20	0.15	18,000	7,200	0.38	0.07	1.39	0.27	0.316	0.061
6	0.09	0.15	184,826	16,634	0.27	0.05	2.21	0.43	0.504	0.098
7	0.02	0.15	124,851	3,088	0.23	0.04	0.35	0.07	0.080	0.015
8	0.07	0.15	118,185	9,874	0.22	0.04	1.09	0.21	0.250	0.048
9	0.08	0.15	95,309	7,625	0.38	0.07	1.47	0.28	0.335	0.065
10	0.06	0.15	22,876	2,745	0.38	0.07	0.53	0.10	0.121	0.023
11	0.08	0.15	6,000	960	0.38	0.07	0.18	0.04	0.042	0.008
12	0.02	0.15	5,760	230	0.38	0.07	0.04	0.01	0.010	0.002
13	0.11	0.15	11,116	1,223	0.38	0.07	0.24	0.05	0.054	0.010
14	0.21	0.15	6,667	2,800	0.28	0.06	0.40	0.08	0.091	0.018
15	0.27	0.15	6,667	1,800	0.28	0.06	0.26	0.05	0.058	0.011
16	0.03	0.15	20,000	1,200	0.41	0.08	0.25	0.05	0.056	0.011
17	0.12	0.15	5,558	667	0.41	0.08	0.14	0.03	0.031	0.006
18	0.06	0.15	19,200	1,152	0.41	0.08	0.24	0.05	0.054	0.011
TOTAL	1.97			237,342			30.37	5.89	6.93	1.34

Paved Road Segments

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	0.42	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	277,896	11,116	0	4,669	4,669	128,388				
1A	0.42	Flyash	0.15	15	25	40	27.5		X	27.5	25	450,000	18,000	0	7,560	7,560	207,900				
1A	0.42	Sand, Iron Ore	0.15	15	25	40	27.5		X	27.5	25	144,000	5,760	0	2,419	2,419	66,528				
1A	0.42	Gypsum	0.15	15	25	40	27.5		X	27.5	25	150,000	6,000	0	2,520	2,520	69,300				
1A	0.42	Cement	0.15	15	25	40	27.5	X		27.5	25	2,382,720	95,309	40,030	0	40,030	1,100,817				
1A	0.42	Base Rock (Limestone)	0.15	15	15	30	22.5	X		22.5	15	100,000	6,667	2,800	0	2,800	63,000				
1A	0.42	Employee Vehicles	0.15	1.75	0	1.75	1.75	X		1.8	0	41,975	41,975	17,630	0	17,630	30,852				
1A	0.42	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
1A	0.42	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
1A	0.42	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
1A	0.42	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
1A	0.42	SUBTOTAL	0.15							21.5			184,826	60,459	17,168	77,627	1,666,784	0.27	0.05	10.30	2.00

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	0.42	Coal/Fuels	0.15	15	25	40	27.5	X		27.5	25	277,896	11,116	4,669	0	4,669	128,388				
1	0.42	Flyash	0.15	15	25	40	27.5	X		27.5	25	450,000	18,000	7,560	0	7,560	207,900				
1	0.42	Sand, Iron Ore	0.15	15	25	40	27.5	X		27.5	25	144,000	5,760	2,419	0	2,419	66,528				
1	0.42	Gypsum	0.15	15	25	40	27.5	X		27.5	25	150,000	6,000	2,520	0	2,520	69,300				
1	0.42	Cement	0.15	15	25	40	27.5		X	27.5	25	2,382,720	95,309	0	40,030	40,030	1,100,817				
1	0.42	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	100,000	6,667	0	2,800	2,800	63,000				
1	0.42	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	41,975	41,975	0	17,630	17,630	30,852				
1	0.42	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
1	0.42	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
1	0.42	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
1	0.42	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
1	0.42	SUBTOTAL	0.15							21.5			184,826	17,168	60,459	77,627	1,666,784	0.27	0.05	10.30	2.00

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	0.03	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
2	0.03	Flyash	0.15	15	25	40	27.5	X	X	27.5	25	450,000	18,000	540	540	1,080	29,700				
2	0.03	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
2	0.03	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
2	0.03	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
2	0.03	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
2	0.03	Employee Vehicles	0.15	1.75	0	1.75	1.75	X	X	1.8	0	41,975	41,975	1,259	1,259	2,519	4,407				
2	0.03	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
2	0.03	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
2	0.03	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
2	0.03	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
2	0.03	SUBTOTAL	0.15							9.5			59,975	1,799	1,799	3,599	34,107	0.08	0.01	0.14	0.03

Paved Road Segments

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	0.16	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
3	0.16	Flyash	0.15	15	25	40	27.5	X	X	27.5	25	450,000	18,000	2,880	2,880	5,760	158,400				
3	0.16	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
3	0.16	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
3	0.16	Cement	0.15	15	22	37	26					2,382,720	0	0	0	0					
3	0.16	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
3	0.16	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	41,975	41,975	0	6,716	6,716	11,753				
3	0.16	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
3	0.16	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
3	0.16	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
3	0.16	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
3	0.16	SUBTOTAL	0.15							13.6			59,975	2,880	9,596	12,476	170,153	0.13	0.03	0.84	0.16

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)
4	0.21	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
4	0.21	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
4	0.21	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
4	0.21	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
4	0.21	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
4	0.21	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
4	0.21	Employee Vehicles	0.15	1.75	0	1.75	1.75		X	1.8	0	41,975	41,975	0	8,815	8,815	15,426				
4	0.21	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
4	0.21	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
4	0.21	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
4	0.21	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
4	0.21	SUBTOTAL	0.15							1.8			41,975	0	8,815	8,815	15,426	0.01	0.00	0.03	0.00

Paved Road Segments

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	0.20	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
5	0.20	Flyash	0.15	15	25	40	27.5	X	X	27.5	25	450,000	18,000	3,600	3,600	7,200	198,000				
5	0.20	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
5	0.20	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
5	0.20	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
5	0.20	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
5	0.20	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
5	0.20	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
5	0.20	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
5	0.20	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
5	0.20	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
5	0.20	SUBTOTAL	0.15							27.5			18,000	3,600	3,600	7,200	198,000	0.38	0.07	1.39	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)
6	0.09	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	277,896	11,116	0	1,000	1,000	27,512				
6	0.09	Flyash	0.15	15	25	40	27.5		X	27.5	25	450,000	18,000	0	1,620	1,620	44,550				
6	0.09	Sand, Iron Ore	0.15	15	25	40	27.5		X	27.5	25	144,000	5,760	0	518	518	14,256				
6	0.09	Gypsum	0.15	15	25	40	27.5		X	27.5	25	150,000	6,000	0	540	540	14,850				
6	0.09	Cement	0.15	15	25	40	27.5		X	27.5	25	2,382,720	95,309	0	8,578	8,578	235,889				
6	0.09	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	100,000	6,667	0	600	600	13,500				
6	0.09	Employee Vehicles	0.15	1.75	0	1.75	1.75	X		1.8	0	41,975	41,975	3,778	0	3,778	6,611				
6	0.09	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
6	0.09	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
6	0.09	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
6	0.09	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
6	0.09	SUBTOTAL	0.15							21.5			184,826	3,778	12,857	16,634	357,168	0.27	0.05	2.21	0.43

Paved Road Segments																					
				Truck Weights				Truck Trips													
Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Empty (Tons)	Capacity	Loaded (Tons)	Avg (Tons)	Empty	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	0.02	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	277,896	11,116	222	222	445	12,227				
7	0.02	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
7	0.02	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	144,000	5,760	115	115	230	6,336				
7	0.02	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	150,000	6,000	120	120	240	6,600				
7	0.02	Cement	0.15	15	25	40	27.5	X		15.0	25	2,382,720	95,309	1,906	0	1,906	28,593				
7	0.02	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22.5	15	100,000	6,667	133	133	267	6,000				
7	0.02	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
7	0.02	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
7	0.02	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
7	0.02	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
7	0.02	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
7	0.02	SUBTOTAL	0.15							19.4			124,851	2,497	591	3,088	59,756	0.23	0.04	0.35	0.07
				Truck Weights				Truck Trips													
Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Empty (Tons)	Capacity	Loaded (Tons)	Avg (Tons)	Empty	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	0.07	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	277,896	11,116	778	778	1,556	42,796				
8	0.07	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
8	0.07	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	144,000	5,760	403	403	806	22,176				
8	0.07	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	150,000	6,000	420	420	840	23,100				
8	0.07	Cement	0.15	15	25	40	27.5	X		15.0	25	2,382,720	95,309	6,672	0	6,672	100,074				
8	0.07	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
8	0.07	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
8	0.07	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
8	0.07	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
8	0.07	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
8	0.07	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
8	0.07	SUBTOTAL	0.15							19.1			118,185	8,273	1,601	9,874	188,146	0.22	0.04	1.09	0.21

Paved Road Segments

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	0.08	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
9	0.08	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
9	0.08	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
9	0.08	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
9	0.08	Cement	0.15	15	25	40	27.5		X	27.5	25	2,382,720	95,309	0	7,625	7,625	209,679				
9	0.08	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
9	0.08	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
9	0.08	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
9	0.08	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
9	0.08	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
9	0.08	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
9	0.08	SUBTOTAL	0.15							27.5			95,309	0	7,625	7,625	209,679	0.38	0.07	1.47	0.28

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	0.06	Coal/Fuels	0.15	15	25	40	27.5	X	X	27.5	25	277,896	11,116	667	667	1,334	36,682				
10	0.06	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
10	0.06	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	144,000	5,760	346	346	691	19,008				
10	0.06	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	150,000	6,000	360	360	720	19,800				
10	0.06	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
10	0.06	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
10	0.06	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
10	0.06	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
10	0.06	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
10	0.06	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
10	0.06	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
10	0.06	SUBTOTAL	0.15							27.5			22,876	1,373	1,373	2,745	75,490	0.38	0.07	0.53	0.10

Paved Road Segments

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	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	0.08	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
11	0.08	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
11	0.08	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
11	0.08	Gypsum	0.15	15	25	40	27.5	X	X	27.5	25	150,000	6,000	480	480	960	26,400				
11	0.08	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
11	0.08	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
11	0.08	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
11	0.08	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
11	0.08	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
11	0.08	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
11	0.08	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
11	0.08	SUBTOTAL	0.15							27.5			6,000	480	480	960	26,400	0.38	0.07	0.18	0.04

Segment No.	Segment Length (mi)	Material	Silt Loading (g/m2)	Truck Weights Empty (Tons)	Capacity	Loaded (Tons)	Avg (Tons)	Truck Trips Empty	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	0.02	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
12	0.02	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
12	0.02	Sand, Iron Ore	0.15	15	25	40	27.5	X	X	27.5	25	144,000	5,760	115	115	230	6,336				
12	0.02	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
12	0.02	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
12	0.02	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
12	0.02	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
12	0.02	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
12	0.02	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
12	0.02	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
12	0.02	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
12	0.02	SUBTOTAL	0.15							27.5			5,760	115	115	230	6,336	0.38	0.07	0.04	0.01

Paved Road Segments

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	0.11	Coal/Fuels	0.15	15	25	40	27.5		X	27.5	25	277,896	11,116	0	1,223	1,223	33,625				
13	0.11	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
13	0.11	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
13	0.11	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
13	0.11	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
13	0.11	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
13	0.11	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
13	0.11	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
13	0.11	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
13	0.11	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
13	0.11	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
13	0.11	SUBTOTAL	0.15							27.5			11,116	0	1,223	1,223	33,625	0.38	0.07	0.24	0.05

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	0.21	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
14	0.21	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
14	0.21	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
14	0.21	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
14	0.21	Cement	0.15	15	22	37	26					2,382,720	0	0	0	0					
14	0.21	Base Rock (Limestone)	0.15	15	15	30	22.5	X	X	22.5	15	100,000	6,667	1,400	1,400	2,800	63,000				
14	0.21	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
14	0.21	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
14	0.21	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
14	0.21	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
14	0.21	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
14	0.21	SUBTOTAL	0.15							22.5			6,667	1,400	1,400	2,800	63,000	0.28	0.06	0.40	0.08

Paved Road Segments

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	0.27	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
15	0.27	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
15	0.27	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
15	0.27	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
15	0.27	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
15	0.27	Base Rock (Limestone)	0.15	15	15	30	22.5		X	22.5	15	100,000	6,667	0	1,800	1,800	40,500				
15	0.27	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
15	0.27	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
15	0.27	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
15	0.27	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
15	0.27	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
15	0.27	SUBTOTAL	0.15							22.5			6,667	0	1,800	1,800	40,500	0.28	0.06	0.26	0.05

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	0.03	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
16	0.03	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
16	0.03	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
16	0.03	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
16	0.03	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
16	0.03	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
16	0.03	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
16	0.03	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
16	0.03	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
16	0.03	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75	X	X	28.8	7.5	150,000	20,000	600	600	1,200	34,500				
16	0.03	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
16	0.03	SUBTOTAL	0.15							28.8			20,000	600	600	1,200	34,500	0.41	0.08	0.25	0.05

Paved Road Segments

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	0.12	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
17	0.12	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
17	0.12	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
17	0.12	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
17	0.12	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
17	0.12	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
17	0.12	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
17	0.12	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
17	0.12	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75					72,000	0	0	0	0					
17	0.12	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
17	0.12	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75		X	28.8	7.5	41,684	5,558	0	667	667	19,175				
17	0.12	SUBTOTAL	0.15							28.8			5,558	0	667	667	19,175	0.41	0.08	0.14	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)
18	0.06	Coal/Fuels	0.15	15	25	40	27.5					277,896	0	0	0	0					
18	0.06	Flyash	0.15	15	25	40	27.5					450,000	0	0	0	0					
18	0.06	Sand, Iron Ore	0.15	15	25	40	27.5					144,000	0	0	0	0					
18	0.06	Gypsum	0.15	15	25	40	27.5					150,000	0	0	0	0					
18	0.06	Cement	0.15	15	25	40	27.5					2,382,720	0	0	0	0					
18	0.06	Base Rock (Limestone)	0.15	15	15	30	22.5					100,000	0	0	0	0					
18	0.06	Employee Vehicles	0.15	1.75	0	1.75	1.75					41,975	0	0	0	0					
18	0.06	Front End Loader 1 Sand	0.15	25	7.5	32.5	28.75		X	28.8	7.5	72,000	9,600	0	576	576	16,560				
18	0.06	Front End Loader 2 Iron Ore	0.15	25	7.5	32.5	28.75		X	28.8	7.5	72,000	9,600	0	576	576	16,560				
18	0.06	Front End Loader 3 Gypsum	0.15	25	7.5	32.5	28.75					150,000	0	0	0	0					
18	0.06	Front End Loader 4 Coal	0.15	25	7.5	32.5	28.75					41,684	0	0	0	0					
18	0.06	SUBTOTAL	0.15							28.8			19,200	0	1,152	1,152	33,120	0.41	0.08	0.24	0.05
		GRAND TOTAL														159,715				30.37	5.89

Paved Road Segments					
	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			

Unpaved Road Emission Summary

Segment No.	Trip Length (mi)	Silt Content (%)	Material Trips (#/yr)	Total Mileage (Mi/yr)	Maximum Annual Emissions 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)
19	0.11	8.3	460,000	50,600	6.77	1.92	8.56	2.43	1.955	0.556
20	0.08	8.3	13,333	1,067	6.77	1.92	0.18	0.05	0.041	0.012
TOTAL	0.19			51,667			8.74	2.49	2.00	0.57

Unpaved Roads

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	3,450,000	0.11	7.5	25	28.75	8.3	50,600	6.77	1.92	95%	8.56	2.43
20	Front End Loader-Base Rock	100,000	0.08	7.5	25	28.75	8.3	1,067	6.77	1.92	95%	0.18	0.05
											Total Emissions	8.74	2.49

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.

Material	Amount of Material		Truck/Loader Weight (Empty)		Truck/Loader Capacity		Total Trips
Cement	2,382,720	tons/year	15	tons	25	tons	95,309
Fly Ash	450,000	tons/year	15	tons	25	tons	18,000
Sand	72,000	tons/year	15	tons	25	tons	2,880
Iron Ore	72,000	tons/year	15	tons	25	tons	2,880
Coal	277,896	tons/year	15	tons	25	tons	11,116
Gypsum	150,000	tons/year	15	tons	25	tons	6,000
Employee Traffic	115	employees/day	3,500	lbs	1	employee	41,975

Front End Loader 1 Sand	72,000	tons/year	25	tons	7.5	tons	9,600
Front End Loader 2 Iron Ore	72,000	tons/year	25	tons	7.5	tons	9,600
Front End Loader 3 Gypsum	150,000	tons/year	25	tons	7.5	tons	20,000
Front End Loader 4 Coal	41,684	tons/year	25	tons	7.5	tons	5,558

Quarry							
Front End Loaders Limestone	3,450,000	tons/year	25	tons	7.5	tons	460,000
Base Rock (Limestone)	100,000	tons/year	25	tons	7.5	tons	13,333

AIR DISPERSION MODELING REPORT
FOR PSD PERMIT APPLICATION
SUWANNEE AMERICAN CEMENT

Prepared for:

Suwannee American Cement Company
U.S Route 27
Branford, Florida 32008

PN 050430.0001.002
050430.0001.003

Prepared by:

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February 23, 2005

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EXECUTIVE SUMMARY

This document provides the dispersion modeling analysis required as part of the Prevention of Significant Deterioration (PSD) submittal for the proposed Suwannee American Cement Company (SAC) Line 2 expansion project in Branford, Florida. The document includes an evaluation of the Class II area Significant Impact Levels (SILs) and associated Significant Impact Areas (SIA), Class I and II area PSD increment consumption, impact on the National Ambient Air Quality Standards (NAAQS) in the Class II area, and Class I area visibility impacts and sulfate/nitrate deposition, and other additional impacts. Based on the dispersion modeling performed for pollutant emissions from the existing and the proposed new and modified sources at SAC, the ambient air impacts of the project are below the levels specified by all applicable regulatory requirements, and the application should be approvable on the basis of the proposed impacts on air quality.

The SIA analysis for CO, SO_2, and NO_2 resulted in less than SILs, but greater than the SIL for PM_{10}. Impacts of PM_{10} greater than the SILs required that additional modeling be performed for Class II area PSD increment and NAAQS analyses for PM_{10}. Building downwash was included in the modeling. Terrain in the area is flat to gently rolling and thus, not a significant concern. Nonetheless, elevations for all source, building, and receptor locations were included in the analysis.

Other existing sources in the region out to about 100 km were considered in terms of their potential interactive impacts for the NAAQS and PSD increment analysis. A 20D analysis was conducted on the inventory of PM_{10} sources provided by FDEP with those not screening out being included in the modeling. The results of the Class I area visibility, nitrate/sulfate deposition, and increment consumption analyses indicated all impacts at the four Class I areas were less than the applicable Air Quality Related Values (Okefenokee, Chasshowitka, St. Marks, and Bradwell Bay). Additional impacts analysis for emissions associated with growth in the area and vegetation and soils showed impacts that were insignificant when compared to overall emissions in the area and applicable levels of effect, respectively.

SECTION 1

PROJECT AND ANALYSIS OVERVIEW

1.1 Project Overview

The Line 2 expansion project consists of adding a second dry process preheater/precalciner kiln to the existing facility located northeast of the intersection of U.S. Route 27 (east-west highway) and County Road 49 (north-south roadway). The facility property is located about 3.7 miles east of Branford. Figure 1-1 shows the location of the property with respect to the roadway landmarks and surrounding area geographical setting which is predominantly rural and mixed pine forest. Additional operations that will be affected by the Line 2 expansion are increased quarry and conveying activity, increased material handling and storage, and increased roadway traffic due to incoming supplies and outgoing cement trucks.

Detailed discussion of the project is provided in the permit application. As discussed in the Regulatory Analysis Report for that application, Prevention of Significant Deterioration (PSD) review is required under the provisions of FAC 62-212.400 for all criteria pollutants except lead. The pollutants requiring ambient air quality impact assessment are: PM_{10}, NO_2, SO_2, and CO.

This document provides the dispersion modeling documentation that fulfills the ambient air quality impact requirements of the permit application. This document covers all aspects of the required modeling including an evaluation of the Class II area, SILs and associated SIA, Class I and II area PSD increment consumption, impact on the NAAQS in the Class II area, Class I area visibility impacts and sulfate/nitrate deposition, and other additional impacts.

The facility is subject to the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Portland Cement facilities, and no State air toxics impact analysis is required (memorandum from Howard Rhodes, Director of the Florida Division of Air Resources Management, March 1, 2000, *Revised Guidance on the Permitting of Sources Emitting Hazardous Air Pollutants*).

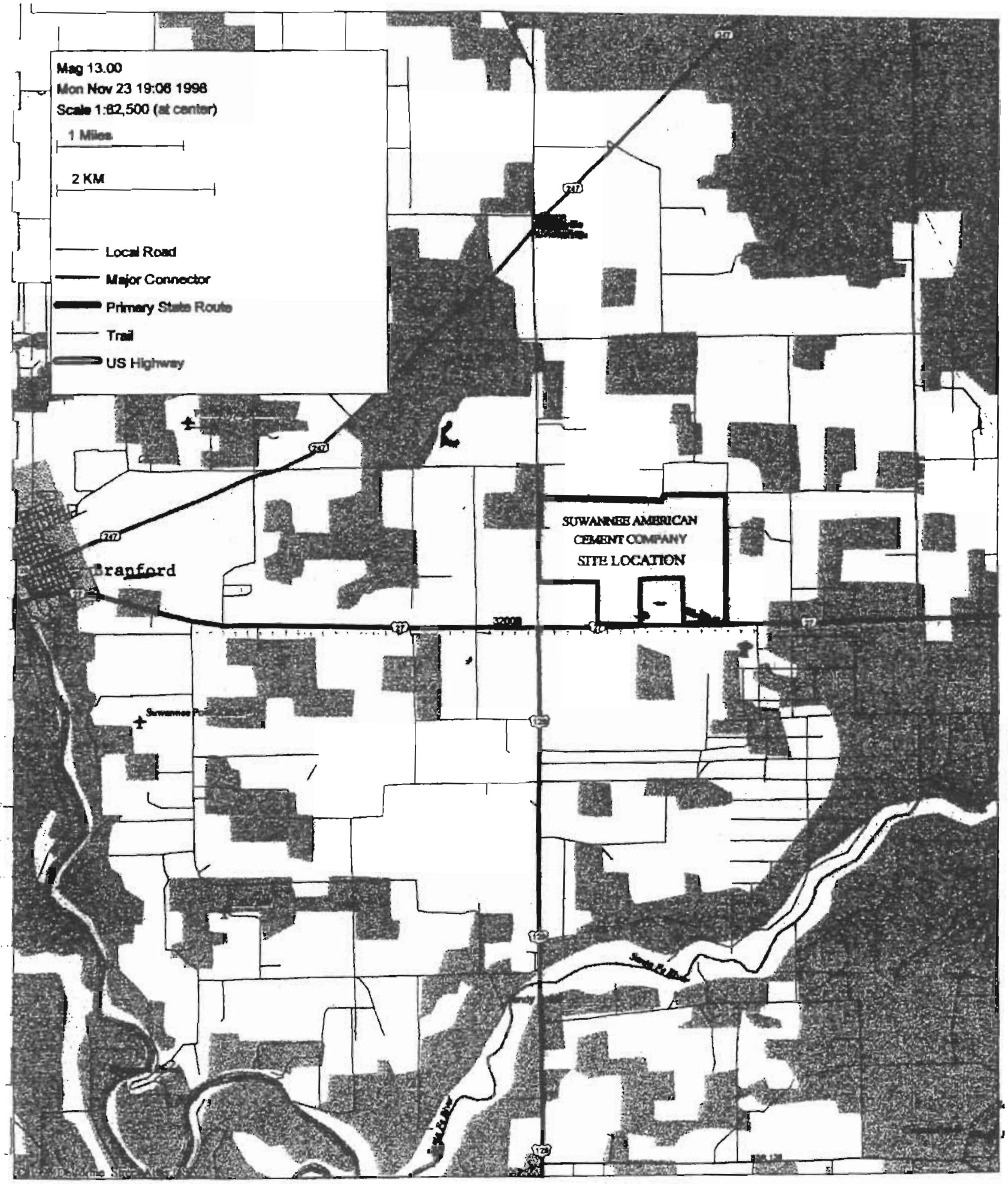

Figure 1-1. Location of Suwannee American Cement

1.2 Modeling Overview

This section provides an overview of the dispersion modeling analysis which was followed to perform the air quality impact assessments in support of the permit application. This analysis addresses the methodologies and models that were used to assess the SIA's for each criteria pollutant, the significant monitoring impacts, the PSD increment consumption due to all PSD increment consuming sources for any pollutants that exceed the applicable SIL, the overall impacts on the NAAQS (including other sources in the area) for any pollutants that exceed the applicable SIL, Class I impacts, and additional air impacts. A summary of the completed dispersion modeling is as follows:

- Used the ISCST3 Model (Industrial Source Complex Model, Version 3 in its short-term mode - Version 00101 - using the BeeLine software called BEEST - Version 9.40) including terrain in the area in the model using 30m Digital Elevation Model (DEM) data as well as building downwash.

- Used the BPIP (Building Profile Input Program) model for all downwash calculations (latest version is included in the BEEST software).

- Performed ISCST3 modeling to discern the significant impact area (SIA) for each SIL for all proposed sources and source modifications for each applicable criteria pollutant; for those pollutants where no significant impacts occur at or beyond the plant fence line, no further modeling analysis is required for that pollutant.

- For any SIL that was exceeded beyond the fence line, additional modeling was performed using the ISCST3 Model for PSD increment concentration impacts, preconstruction monitoring exemptions, and NAAQS analysis including other sources of that pollutant located within the SIA as well as other sources within about 75 km that had emissions greater than the 20D distance (i.e., were included in the analysis) and background concentrations supplied by the FDEP.

- Used the CALPUFF Model in its screening mode (CALPUFF-lite) to estimate visibility, nitrate/sulfate concentrations, and Class I increment consumption for the four Class I areas within 200 km of the SAC Branford site. Used the receptors and their respective distances to SAC for each of the four Class I areas.

- Included all modeling elements as applicable and discussed with FDEP at the modeling meeting held November 15, 2004 and summarized in a letter to FDEP dated November 23, 2004 (attached as Appendix A to this modeling report).

Followed modeling guidance given verbally by the State as well that in the *Guideline on Air Quality Models*, FR Volume 68, No. 72, 18440, April 15, 2003.

° Will submit electronic copies of all input and output files from the models (including the ISCST3, CALPUFF, and BPIP models) to FDEP.

1.3 PSD Baseline and Increment Availability

The baseline date in an area is defined as the date at the time of the first permit application in the area subject to PSD requirements. Baseline dates must be defined for each pollutant that consumes PSD increments. The area in question is that area designated as attainment or unclassifiable in the area surrounding the SAC plant in which the source would exceed the SIL's. The baseline date for this area was established previously by other facilities' PSD applications, specifically by the Florida Rock Cement plant near Gainesville which constructed a cement production facility in 1994 30 km to the southeast of SAC. The baseline date was set for PM_{10}, NO_x, and SO_2. All the Florida Rock sources (current and proposed) were therefore considered in the combined PSD increment consumption analysis for the area around SAC.

Because the significant impact area for PM_{10} was within 10 km of the proposed site and existing monitors were located in nearby counties, preconstruction monitoring was not required at the discretionary authority exercised by the FDEP. All background air concentrations were provided by those monitors in the FDEP monitoring network.

SECTION 2

SAC PLANT DESCRIPTION

The site of the proposed Line 2 Expansion for SAC is the Branford facility located just northeast of the junction of U.S. Route 27 and County Road 49 in Suwannee County, Florida. Figure 1-1 shows the location of the facility with regard to the roads and surrounding geographical setting. Figure 2-1 presents a closer view of the site including the outline of existing paved roads, buildings, proposed sources, and the fenced property boundary. The site being considered in this modeling is the immediate area just west of the location of Line 1 of SAC.

The geographical setting around the plant is very flat to gently rolling with very few significant elevated terrain features. The Suwannee River runs from north northwest to the south southeast a few miles to the west of the plant and the Santa Fe River runs from northeast to southwest about two miles to the southeast of the plant. Neither river creates much of a terrain change from the surrounding near flat topography. Most terrain within 10 kilometers of the site is at about the same elevation as the plant, i.e., in the 55 to 90 foot range above sea level. The area is characterized by small farms, small businesses, pine tree plantations, and sparse residences. The town of Branford lies 3.7 miles to the west on U.S. Route 27 and has less than 1000 persons.

The building configuration at the plant consists of multiple building complexes and many outbuildings used for storage, maintenance, and other support services. Many of these buildings were constructed with their major building axes laying from north to south in keeping with the straight line of operations for the cement line. The exception is various storage areas and buildings as well as the quarry operations and conveying systems which are spread throughout the facility. Figure 2-2 presents the existing and proposed buildings and sources for the SAC plant. The figure also shows silos, stacks, parking areas, roadways, and materials handling areas.

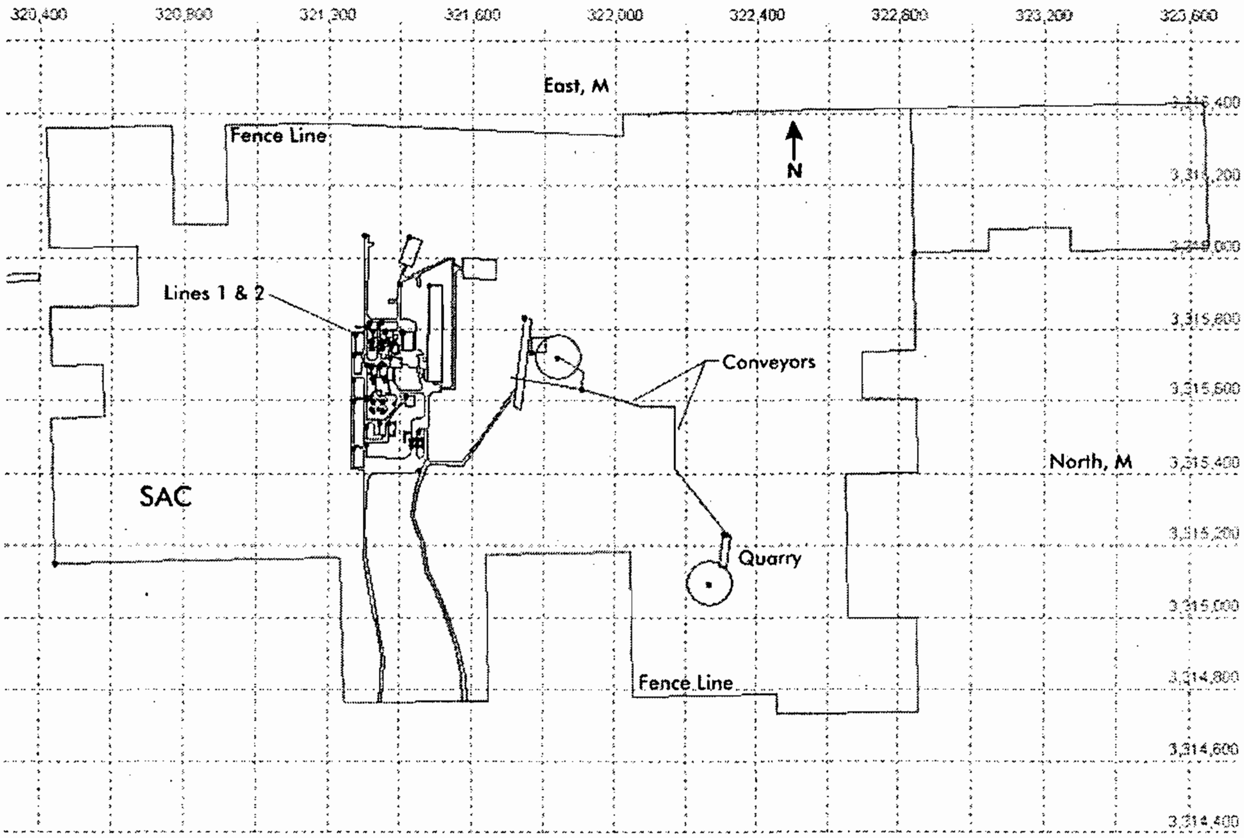

Figure 2-1. Layout of SAC Plant

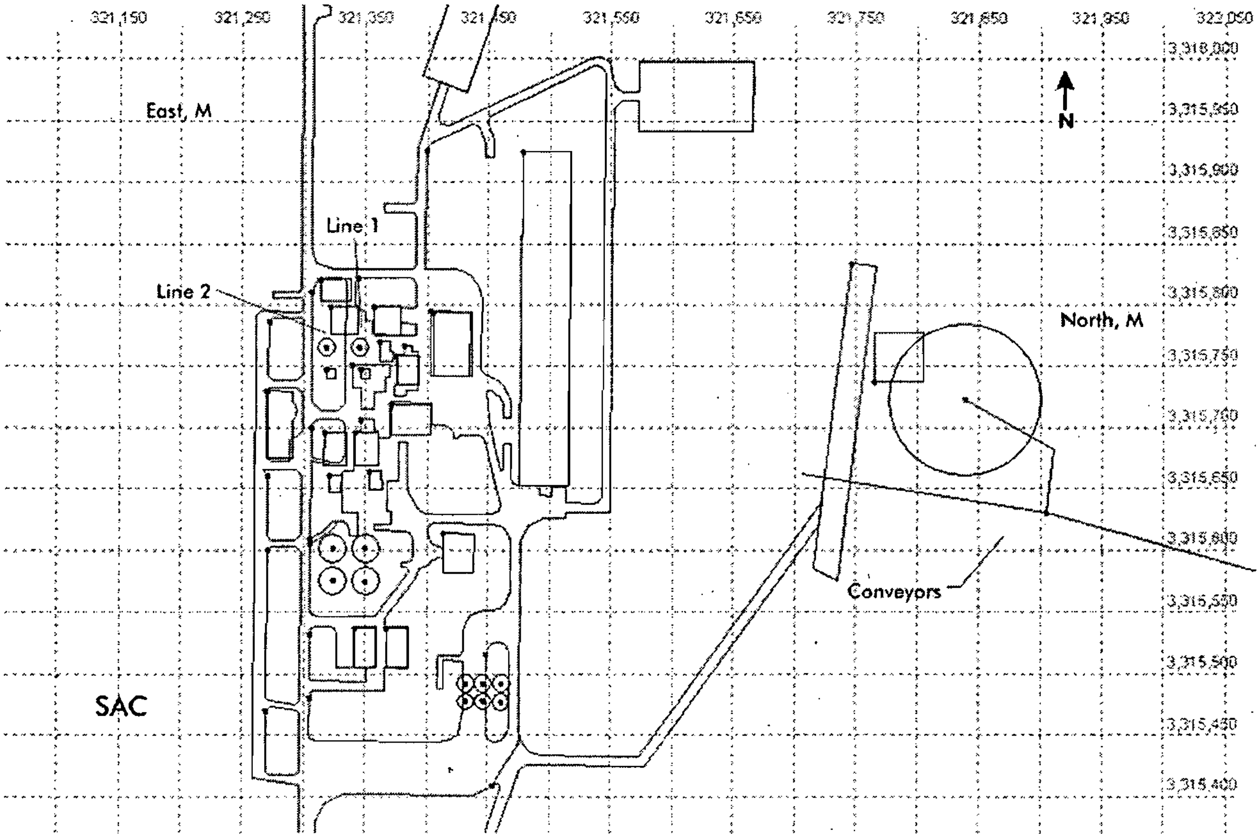

Figure 2-2. SAC Facility Building and Source Configuration

SECTION 3

SOURCE IDENTIFICATION AND CHARACTERIZATION

All proposed sources and source modifications are described in the *Application for Prevention of Significant Deterioration (PSD) Permit.* New sources consist of a full Line 2 cement production operation consisting of a raw mill, a vertical preheater and calciner, an in-line kiln and clinker cooler, clinker handling and storage, finish mill, and cement storage and loadout operations. Other emission increases will occur at a number of existing sources due to increased throughput at the quarry, the primary crusher, conveying, material handling and storage, and roadway traffic. These increases have been considered in the SIA and PSD increment analyses. In addition, existing Line 1 sources at SAC were considered in the NAAQS analysis as were sources within about 75 km that did not pass the other source screening analysis (the so-called 20D analysis whereby individual source emissions in tons per year were greater than 20 times the distance between the facility and SAC in kilometers). Each source (whether characterized as a point, area, or volume) was assigned a unique alphanumeric name in the modeling generally related to the source identification in the SAC permitting or some descriptive name (e.g., the existing finish mill stack was N09-01, where the "01" indicates that the source was related to Line 1; the proposed finish mill stack was N09-02, where the "02" indicates that the source was related to Line 2; and paved road segments were indicated by segment number and subsequent number, such as, PV15-1).

3.1 Proposed or Modified SAC Sources

Table 3-1 presents a complete set of stack, baghouse, and other point sources and their related identifiers along with all associated source parameters, emissions, and locations for all proposed and modified stacks. This table includes all stack parameters and coordinates.

TABLE 3-1. NEW OR MODIFIED SAC POINT SOURCE PARAMETERS AND INCREASED PM_{10} EMISSIONS

Source Identification in ISCST3 Model	Source Description	East, m	North, m	Base Elevation, m	Stack Height, m	Stack Gas Temperature, K	Stack Gas Exit Velocity, m/s	Stack Diameter, m	PM_{10} Emission Rate, lb/hr
E21_02	Kiln/Raw Mill Baghouse Stack	321329.84	3315801.25	17.1	96.0	375	24.3	2.87	23.7
E28_02	Raw Mill - Aeropol	321326.92	3315777.75	17	17.1	422	0.001	0.30	0.15
E34_02	Off Spec. Feed Handling	321315.69	3315744.15	16.8	15.2	422	0.001	0.30	0.10
G07_02	Homogenizing Silo Inlet	321323.66	3315766.04	16.9	73.8	366	0.001	0.67	0.86
H08_02	Poldos Homogenizing Silo Outlet	321315.72	3315747.64	16.8	15.2	366	0.001	0.30	0.11
H08A_02	Hydrated Lime Silo	321319.66	3315733.89	16.8	10.7	333	0.001	0.37	0.17
L03_02	Clinker Pan Conveyor	321319.57	3315676.91	16.8	11.3	422	0.001	0.30	0.15
L06_02	Clinker Silo Inlet	321321.29	3315600.46	17.1	58.5	422	0.001	0.34	0.56
L25_02	Gyp/OS Clinker Transport (Relocated)	321336.66	3315582.26	16.9	25.0	305	0.001	0.30	0.41
M08_02	Clinker Silo Outlet Conveyor	321325.54	3315589.03	17	5.8	373	0.001	0.34	0.34
M09_02	Gyp/OS Clinker Silo Outlet (Relocated)	321336.54	3315589.17	16.9	3.0	305	0.001	0.34	0.31
N09_02	Finish Mill Separator	321368.94	3315515.75	16.8	53.3	343	57.6	1.22	7.29
N12_02	Finish Mill BH	321382.38	3315535.75	16.8	53.3	368	56.6	0.91	1.95
N36_02	Fringe Cement Bin	321381.97	3315501.82	16.8	19.8	328	0.001	0.43	0.26
N91_02	Finish Mill Baghouse No. 3 (S)	321384.16	3315520	16.8	14.3	366	0.001	0.43	0.34
P03_02	Cement Transport Conveyor	321453.65	3315500.32	16.8	16.5	328	0.001	0.30	0.19

Source Identification in ISCST3 Model	Source Description	East, m	North, m	Base Elevation, m	Stack Height, m	Stack Gas Temperature, K	Stack Gas Exit Velocity, m/s	Stack Diameter, m	PM_{10} Emission Rate, lb/hr
P11_02	Cement Silos	321464.26	3315489.46	16.8	59.4	328	0.001	0.61	0.64
Q17_02	Truck Load-out No. 3	321460.9	3315494.33	16.8	11.9	328	0.001	0.30	0.19
S17_02	Coal Mill No. 1 & 2 BH	321384.96	3315671.46	16.9	30.5	339	18.0	0.91	1.47
S21_02	Pulverized Coal Bin	321390.98	3315679.87	16.9	18.3	339	0.001	0.30	0.12
U05_02	Fly Ash Silo	321412.88	3315661.79	17.1	36.6	333	0.001	0.37	0.17

Emissions for each road segment that will have increased traffic as a result of the Line 2 expansion are presented in Table 3-2. Table 3-3 presents the source characteristics and emissions for the storage piles, conveyors, quarry loadout, and main crushed limestone pile.

Emissions tabulations are presented elsewhere in the permit application and are only presented here in the format used in the modeling. These emissions represent the potential short-term and long-term scenarios of operation and thus, will give representative potential air impacts for both the short-term and annual air quality analyses. All coordinates for the sources (as well as all coordinates for other sources, fence lines, and receptors around the plant) were referenced to the Universal Transverse Mercator (UTM) NAD27 format.

3.2 Existing SAC Sources and Other Non-SAC Sources

As shown in Section 4, only PM_{10} was significant in terms of the SIL analysis. Therefore, the only sources that were required for completing the Class II PSD and NAAQS analysis were sources of PM_{10} emissions.

Tables 3-4 through 3-6 provide the point source, road segments, and process-related storage pile and other fugitive emission source parameters and information for existing sources at SAC. Table 3-4 presents the Line 1 point source information, Table 3-5 presents the road segments, and Table 3-6 presents the storage piles and other fugitives. All these existing SAC sources consume increment and thus were included in the Class I and Class II increment analysis as well as the NAAQS analysis.

It should be noted that the road emissions in Tables 3-2 and 3-5 were calculated using site-specific silt loading data measured in accordance with ASTM Method C-136, as opposed to default values in AP-42. This results in the most accurate estimation of PM_{10} emissions and PM_{10} concentrations from paved and unpaved roads.

In order to meet the PSD modeling criteria for reviewing the impacts of other sources within and outside of the SIA, several inventories of facilities and sources were obtained from the FDEP for PM_{10} within a 100 km radius. FDEP's latest inventories (obtained in December 2004) were all obtained electronically. These inventories were used as received from FDEP including actual or potential emissions of PM_{10} as provided. Coordinates for each source were tabulated and compared to the SAC facility (using a coordinate that represented the location of

TABLE 3-2. NEW OR MODIFIED SAC ROADWAY CHARACTERISTICS AND INCREASED PM_{10} EMISSIONS

Road Segment Identification	Road Segment Description	Southwest Corner - East, m	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
PV2	Paved Road Segment No.2 (1 of 1)	321305.06	3315473.5	16.8	4	9.14	51.82	180	1.4	0.0037
PV6_1	Paved Road Segment No.6 (1 of 2)	321306.22	3315433.5	16.8	4	9.14	70.10	90	1.4	0.0480
PV6_2	Paved Road Segment No.6 (2 of 2)	321377.16	3315433	16.8	4	9.14	70.10	90	1.4	0.0480
PV9_1	Paved Road Segment No.9 (1 of 3)	321439.44	3315435.5	16.8	4	6.10	50.29	0	1.4	0.0134
PV9_2	Paved Road Segment No.9 (2 of 3)	321439.5	3315486	16.8	4	6.10	50.29	0	1.4	0.0134
PV9_3	Paved Road Segment No.9 (3 of 3)	321445.63	3315538.5	17	4	6.10	21.34	90	1.4	0.0057
PV7	Paved Road Segment No.7 (1 of 1)	321448.06	3315433.5	16.8	4	9.14	36.58	90	1.4	0.0081
PV8_1	Paved Road Segment No.8 (1 of 2)	321468.22	3315433	16.8	4	9.14	57.91	0	1.4	0.0125
PV8_2	Paved Road Segment No.8 (2 of 2)	321468.25	3315491	16.8	4	9.14	57.91	0	1.4	0.0125
PV10_1	Paved Road Segment No.10 (1 of 2)	321468.59	3315548	17	4	9.14	47.24	0	1.4	0.0063
PV10_2	Paved Road Segment No.10 (2 of 2)	321469.22	3315594.5	16.8	4	9.14	47.24	0	1.4	0.0063
PV3_1	Paved Road Segment No.3 (1 of 4)	321297.75	3315475.25	16.8	4	9.14	65.53	0	1.4	0.0055
PV3_2	Paved Road Segment No.3 (2 of 4)	321297.13	3315541.75	16.8	4	9.14	65.53	0	1.4	0.0055
PV3_3	Paved Road Segment No.3 (3 of 4)	321297.75	3315609	17	4	9.14	65.53	0	1.4	0.0055
PV3_4	Paved Road Segment No.3 (4 of 4)	321297.13	3315675.5	16.8	4	9.14	65.53	0	1.4	0.0055
PV5_1	Paved Road Segment No.5 (1 of 4)	321297.13	3315741.5	16.8	4	9.14	81.53	0	1.4	0.0085
PV5_2	Paved Road Segment No.5 (2 of 4)	321298.34	3315822.25	17.1	4	9.14	81.53	0	1.4	0.0085

Road Segment Identification	Road Segment Description	Southwest Corner - East, m	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
PV5_3	Paved Road Segment No.5 (3 of 4)	321298.97	3315904.75	17.4	4	9.14	81.53	0	1.4	0.0085
PV5_4	Paved Road Segment No.5 (4 of 4)	321298.97	3315986.75	17.4	4	9.14	81.53	0	1.4	0.0085
PV14_1	Paved Road Segment No.14 (1 of 5)	321530.59	3315433	16.9	4	9.14	44.96	90	1.4	0.0013
PV14_2	Paved Road Segment No.14 (2 of 5)	321484.13	3315434	16.8	4	9.14	44.96	90	1.4	0.0013
PV14_3	Paved Road Segment No.14 (3 of 5)	321572.78	3315433	17.1	4	9.14	83.82	35	1.4	0.0024
PV14_4	Paved Road Segment No.14 (4 of 5)	321622.28	3315501.25	17.3	4	9.14	83.82	35	1.4	0.0024
PV14_5	Paved Road Segment No.14 (5 of 5)	321672.06	3315569.75	17.4	4	9.14	83.82	35	1.4	0.0024
PV11_1	Paved Road Segment No.11 (1 of 3)	321474.13	3315622.25	16.8	4	9.14	76.20	270	1.4	0.0024
PV11_2	Paved Road Segment No.11 (2 of 3)	321397.38	3315631	17	4	9.14	36.58	180	1.4	0.0012
PV11_3	Paved Road Segment No.11 (3 of 3)	321398.91	3315607.5	16.8	4	9.14	15.24	90	1.4	0.0005
PV4_1	Paved Road Segment No.4 (1 of 7)	321298.97	3315471.5	16.8	4	6.10	33.53	-84	1.4	0.00003
PV4_2	Paved Road Segment No.4 (2 of 7)	321261.66	3315476.25	16.8	4	6.10	53.64	0	1.4	0.00004
PV4_3	Paved Road Segment No.4 (3 of 7)	321262.91	3315532	16.8	4	6.10	53.64	0	1.4	0.00004
PV4_4	Paved Road Segment No.4 (4 of 7)	321263.5	3315585.75	16.8	4	6.10	53.64	0	1.4	0.00004
PV4_5	Paved Road Segment No.4 (5 of 7)	321264.13	3315640	16.8	4	6.10	53.64	0	1.4	0.00004
PV4_6	Paved Road Segment No.4 (6 of 7)	321263.5	3315694.5	16.8	4	6.10	53.64	0	1.4	0.00004
PV4_7	Paved Road Segment No.4 (7 of 7)	321266.56	3315739	16.8	4	6.10	33.53	90	1.4	0.00003
PV12	Paved Road Segment	321468.59	3315632.25	16.8	4	9.14	33.53	51	1.4	0.0011

Road Segment Identification	Road Segment Description	Southwest Corner - East, m	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
	No.12 (1 of 1)									
PV13_1	Paved Road Segment No.13 (1 of 5)	321464.31	3315636.5	16.8	4	6.10	45.72	-18	1.4	0.0014
PV13_2	Paved Road Segment No.13 (2 of 5)	321450.88	3315678.75	17.1	4	6.10	45.72	-18	1.4	0.0014
PV13_3	Paved Road Segment No.13 (3 of 5)	321439.88	3315727	17.1	4	6.10	24.38	90	1.4	0.0008
PV13_4	Paved Road Segment No.13 (4 of 5)	321469.81	3315722.75	17.1	4	6.10	33.53	180	1.4	0.0010
PV13_5	Paved Road Segment No.13 (5 of 5)	321469.22	3315689.75	17.1	4	6.10	33.53	180	1.4	0.0010
PV16	Paved Road Segment No.16 (1 of 1)	321409.59	3315598	16.8	4	9.14	45.72	-55	1.4	0.0055
PV17	Paved Road Segment No.17 (1 of 1)	321441.69	3315722	17.1	4	6.10	45.72	-115	1.4	0.0033
PV1C_1	Paved Road Segment No.1C (1 of 9)	321315.84	3315425.75	16.8	4	9.14	74.68	185	1.4	0.0268
PV1C_2	Paved Road Segment No.1C (2 of 9)	321310.19	3315352.5	16.8	4	9.14	74.68	185	1.4	0.0268
PV1C_3	Paved Road Segment No.1C (3 of 9)	321304.22	3315279.75	16.5	4	9.14	74.68	180	1.4	0.0268
PV1C_4	Paved Road Segment No.1C (4 of 9)	321304.69	3315206.5	16.2	4	9.14	74.68	172	1.4	0.0268
PV1C_5	Paved Road Segment No.1C (5 of 9)	321314.53	3315132.5	16.4	4	9.14	74.68	170	1.4	0.0268
PV1C_6	Paved Road Segment No.1C (6 of 9)	321327.22	3315060.25	17.1	4	9.14	74.68	170	1.4	0.0268
PV1C_7	Paved Road Segment No.1C (7 of 9)	321342.25	3314988.25	17.6	4	9.14	74.68	167	1.4	0.0268
PV1C_8	Paved Road Segment No.1C (8 of 9)	321358.69	3314914.25	18.3	4	9.14	74.68	182	1.4	0.0268
PV1C_9	Paved Road Segment No.1C (9 of 9)	321355.63	3314838.5	15.1	4	9.14	74.68	187	1.4	0.0268
PV1A_1	Paved Road Segment No.1A (1 of 9)	321477.34	3315426.25	16.1	4	9.14	76.20	200	1.86	0.0506

Road Segment Identification	Road Segment Description	Southwest Corner - East, m	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
PV1A_2	Paved Road Segment No.1A (2 of 9)	321452.06	3315355	16.3	4	9.14	76.20	190	1.86	0.0506
PV1A_3	Paved Road Segment No.1A (3 of 9)	321439.56	3315281.75	17	4	9.14	76.20	160	1.86	0.0506
PV1A_4	Paved Road Segment No.1A (4 of 9)	321465.84	3315209.25	17	4	9.14	76.20	170	1.86	0.0506
PV1A_5	Paved Road Segment No.1A (5 of 9)	321478.97	3315134.75	17.4	4	9.14	76.20	155	1.86	0.0506
PV1A_6	Paved Road Segment No.1A (6 of 9)	321512.09	3315065.5	17.1	4	9.14	76.20	160	1.86	0.0506
PV1A_7	Paved Road Segment No.1A (7 of 9)	321540.22	3314992.75	16.6	4	9.14	76.20	160	1.86	0.0506
PV1A_8	Paved Road Segment No.1A (8 of 9)	321565.56	3314920.5	16.6	4	9.14	76.20	170	1.86	0.0506
PV1A_9	Paved Road Segment No.1A (9 of 9)	321582.09	3314843	16.6	4	9.14	76.20	175	1.86	0.0506
PV15_1	Paved Road Segment No.15 (1 of 8)	321718.97	3315639	17.8	4	6.40	64.01	8	1.4	0.0018
PV15_2	Paved Road Segment No.15 (2 of 8)	321727.97	3315702.75	18.1	4	6.40	64.01	8	1.4	0.0018
PV15_3	Paved Road Segment No.15 (3 of 8)	321736.69	3315766.25	18.2	4	6.40	64.01	8	1.4	0.0018
PV15_4	Paved Road Segment No.15 (4 of 8)	321722.25	3315637.25	17.7	4	6.40	50.29	13	1.4	0.0014
PV15_5	Paved Road Segment No.15 (5 of 8)	321733.66	3315686.5	18	4	6.40	50.29	13	1.4	0.0014
PV15_6	Paved Road Segment No.15 (6 of 8)	321745.78	3315735.5	18.2	4	6.40	50.29	13	1.4	0.0014
PV15_7	Paved Road Segment No.15 (7of 8)	321757.22	3315784.5	17.9	4	6.40	50.29	13	1.4	0.0014
PV15_8	Paved Road Segment No.15 (8 of 8)	321748.16	3315836	16.9	4	6.40	21.00	90	1.4	0.0006

TABLE 3-3. SAC STORAGE PILE AND OTHER FUGITIVE CHARACTERISTICS AND INCREASED PM_{10} EMISSIONS

Source Identification in ISCST3 Model	Source Description	East, m	North, m	Base Elevation, m	Release Height, m	Initial Horizontal Dispersion Coefficient, m	Initial Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/hr
UP19	Crusher Loading at the Quarry	322298.63	3315139.25	17.4	4	10.72	1.86	0.2850
UP20	Baserock Loadout	321785.44	3315758.5	17.9	3	9.3	1.4	0.0070
SP2	Base Rock Pile	321838.69	3315723.25	18	3.05	28.93	2.83	0.0005
SP1	Stone Pile	322266.41	3315097.75	16.5	3.05	28.93	2.83	0.0156
SP345FR1	Limestone, Sand & Iron Ore Storage; Raw Material Storage Building	321496.18	3315788.34	17.8	4.1	24	12.5	0.0375
FQ1_CRSH	Quarry Crusher Area: Loading & Primary Crusher Operations	322314.84	3315235.75	17.1	7	0.7	3.26	0.1247
FQ1_B01	Quarry Crusher Area: Conveyor B01	322297.13	3315253.75	17.3	2	0.47	0.93	0.0155
FQ1_B02	Quarry Crusher Area: Conveyor B02	322281	3315273.75	17.5	2	0.47	0.93	0.0155
FQ1_B03	Quarry Crusher Area: Conveyor B03	322264.78	3315294	17.4	2	0.47	0.93	0.0155
FQ1_B04	Quarry Crusher Area: Conveyor B04	322248.44	3315314	17.4	2	0.47	0.93	0.0155
FQ1_B05	Quarry Crusher Area: Conveyor B05	322232.34	3315334	17.1	2	0.47	0.93	0.0155
FQ1_B06	Quarry Crusher Area: Conveyor B06	322216.19	3315354	17.1	2	0.47	0.93	0.0155
FQ1_B07	Quarry Crusher Area: Conveyor B07	322199.97	3315374.25	16.9	2	0.47	0.93	0.0155
FQ1_B08	Quarry Crusher Area: Conveyor B08	322183.5	3315394.5	16.9	2	0.47	0.93	0.0155
FQ2_B08	Quarry Conveyors: B08 to B20	322168.69	3315415	17.8	2	0.47	0.93	0.0155
FQ2_B20	Quarry Conveyors: B20 to B21	322166.56	3315583.5	17.1	2	0.47	0.93	0.0155

Source Identification in ISCST3 Model	Source Description	East, m	North, m	Base Elevation, m	Release Height, m	Initial Horizontal Dispersion Coefficient, m	Initial Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/hr
FQ2_B21	Quarry Conveyors: B21 to B22	322072.34	3315584.25	16.8	2	0.47	0.93	0.0155
FQ2_B22	Quarry Conveyors: B22 to B24 & B22 to B40	321905.56	3315631	17.9	2	0.47	0.93	0.0005
FQ2_B24	Quarry Conveyors: B24 to B27	321910.81	3315683	17.9	2	0.47	0.93	0.0005
FQ2_B27	Quarry Conveyors: B27 to Radial Stacker	321838.88	3315724	18	2	0.47	0.93	0.0005
FQ2_B40	Quarry Conveyors: B40 to C01	321705.63	3315663	17.9	7	0.47	3.26	0.0015
SP6_FR2	Ash Storage; Fly Ash Storage Building	321426.38	3316017.05	18	10.35	12.88	9.63	0.0038
SP7	Gypsum Storage	321425.9	3315597.77	16.8	6.1	6.48	5.67	0.0007
SP8_FF1	Coal Storage; Coal Handling	321386.56	3315708.25	16.8	6.1	6.55	5.67	0.0037
FR3B_02	Raw Storage Bins (New)	321325.03	3315891.34	17.4	4.57	2.46	2.13	0.0146
FR4	Gypsum Transfer	321367.59	3315627.25	16.8	0.3	0.47	0.47	0.0019

TABLE 3-4. EXISTING SAC POINT SOURCE PARAMETERS AND PM_{10} EMISSIONS

Source Identification in ISCST3 Model	Source Description	East, M	North, m	Base Elevation, m	Stack Height, m	Stack Gas Temperature, K	Stack Gas Exit Velocity, m/s	Stack Diameter, m	PM_{10} Emission Rate, lb/hr
E21_01	Kiln/Raw Mill Baghouse Stack	321359.01	3315731.44	16.9	96.0	375	16.0	2.87	19.6
E28_01	Raw Mill - Aeropol	321361.74	3315777.53	17.1	17.1	422	0.001	0.30	0.15
E34_01	Off Spec. Feed Handling	321342.86	3315744.06	16.9	15.2	422	0.001	0.30	0.10
G07_01	Homogenizing Silo Inlet	321350.87	3315765.87	17	73.8	366	0.001	0.67	0.86
H08_01	Poldos Homogenizing Silo Outlet	321342.87	3315747.48	16.9	15.2	366	0.001	0.30	0.11
H08A_01	Hydrated Lime Silo	321345.83	3315732.22	16.8	10.7	333	0.001	0.37	0.17
K15_01	Clinker Cooler ESP Stack	321363.4	3315641.91	16.9	65.2	547	21.1	2.13	10.7
L03_01	Clinker Pan Conveyor	321354.19	3315671.73	16.8	11.3	422	0.001	0.30	0.15
L06_01	Clinker Silo Inlet	321347.97	3315600.47	16.9	58.5	422	0.001	0.34	0.56
M08_01	Clinker Silo Outlet Conveyor	321347.27	3315588.75	16.8	5.8	373	0.001	0.34	0.34
N09_01	Finish Mill BH Sepol No.1 (W)	321341.97	3315516.75	16.8	53.3	343	57.6	1.22	7.29
N12_01	Finish Mill BH-Mill No.2 (E)	321354.63	3315536	16.8	53.3	368	56.6	0.91	1.95
N36_01	Fringe Cement Bin	321355.89	3315502.01	16.8	19.8	328	0.001	0.43	0.26
N91_01	Finish Mill Baghouse No. 3 (S)	321357.94	3315520	16.8	14.3	366	0.001	0.43	0.34
P03_01	Cement Transport Conveyor	321437.87	3315499.72	16.8	16.5	328	0.001	0.30	0.19
P11_01	Cement Silo Input	321435.09	3315489.69	16.8	59.4	328	0.001	0.61	0.96
Q14_01	Truck Load-out No. 1 (W)	321445.95	3315494.46	16.8	8.8	328	0.001	0.30	0.19
Q17_01	Truck Load-out No. 2 (E)	321431.92	3315494.52	16.8	11.9	328	0.001	0.30	0.19
Q24_01	Railcar Load-out	321460.9	3315494.33	16.8	17.4	328	0.001	0.30	0.32

Source Identification in ISCST3 Model	Source Description	East, M	North, m	Base Elevation, m	Stack Height, m	Stack Gas Temperature, K	Stack Gas Exit Velocity, m/s	Stack Diameter, m	PM_{10} Emission Rate, lb/hr
S17_01	Coal Mill No. 1 & 2 BH	321373.45	3315659.12	16.9	30.5	339	18.0	0.91	1.47
S21_01	Pulverized Coal Bin	321367.61	3315675.79	16.8	18.3	339	0.001	0.30	0.12
U05_01	Fly Ash Silo	321392.14	3315661.79	17.1	36.6	333	0.001	0.37	0.17

TABLE 3-5. NEW, MODIFIED AND EXISTING SAC ROADWAY CHARACTERISTICS AND TOTAL PM_{10} EMISSIONS

Road Segment Identification	Road Segment Description	Southwest Corner - East, M	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
PV2	Paved Road Segment No.2 (1 of 1)	321305.06	3315473.5	16.8	4	9.14	51.82	180	1.4	0.0060
PV6_1	Paved Road Segment No.6 (1 of 2)	321306.22	3315433.5	16.8	4	9.14	70.10	90	1.4	0.0490
PV6_2	Paved Road Segment No.6 (2 of 2)	321377.16	3315433	16.8	4	9.14	70.10	90	1.4	0.0490
PV9_1	Paved Road Segment No.9 (1 of 3)	321439.44	3315435.5	16.8	4	6.10	50.29	0	1.4	0.0270
PV9_2	Paved Road Segment No.9 (2 of 3)	321439.5	3315486	16.8	4	6.10	50.29	0	1.4	0.0270
PV9_3	Paved Road Segment No.9 (3 of 3)	321445.63	3315538.5	17	4	6.10	21.34	90	1.4	0.0110
PV7	Paved Road Segment No.7 (1 of 1)	321448.06	3315433.5	16.8	4	9.14	36.58	90	1.4	0.0150
PV8_1	Paved Road Segment No.8 (1 of 2)	321468.22	3315433	16.8	4	9.14	57.91	0	1.4	0.0240
PV8_2	Paved Road Segment No.8 (2 of 2)	321468.25	3315491	16.8	4	9.14	57.91	0	1.4	0.0240
PV10_1	Paved Road Segment No.10 (1 of 2)	321468.59	3315548	17	4	9.14	47.24	0	1.4	0.0120
PV10_2	Paved Road Segment No.10 (2 of 2)	321469.22	3315594.5	16.8	4	9.14	47.24	0	1.4	0.0120
PV3_1	Paved Road Segment No.3 (1 of 4)	321297.75	3315475.25	16.8	4	9.14	65.53	0	1.4	0.0090
PV3_2	Paved Road Segment No.3 (2 of 4)	321297.13	3315541.75	16.8	4	9.14	65.53	0	1.4	0.0090
PV3_3	Paved Road Segment No.3 (3 of 4)	321297.75	3315609	17	4	9.14	65.53	0	1.4	0.0090
PV3_4	Paved Road Segment No.3 (4 of 4)	321297.13	3315675.5	16.8	4	9.14	65.53	0	1.4	0.0090
PV5_1	Paved Road Segment No.5 (1 of 4)	321297.13	3315741.5	16.8	4	9.14	81.53	0	1.4	0.0150

Road Segment Identification	Road Segment Description	Southwest Corner - East, M	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
PV5_2	Paved Road Segment No.5 (2 of 4)	321298.34	3315822.25	17.1	4	9.14	81.53	0	1.4	0.0150
PV5_3	Paved Road Segment No.5 (3 of 4)	321298.97	3315904.75	17.4	4	9.14	81.53	0	1.4	0.0150
PV5_4	Paved Road Segment No.5 (4 of 4)	321298.97	3315986.75	17.4	4	9.14	81.53	0	1.4	0.0150
PV14_1	Paved Road Segment No.14 (1 of 5)	321530.59	3315433	16.9	4	9.14	44.96	90	1.4	0.0020
PV14_2	Paved Road Segment No.14 (2 of 5)	321484.13	3315434	16.8	4	9.14	44.96	90	1.4	0.0020
PV14_3	Paved Road Segment No.14 (3 of 5)	321572.78	3315433	17.1	4	9.14	83.82	35	1.4	0.0040
PV14_4	Paved Road Segment No.14 (4 of 5)	321622.28	3315501.25	17.3	4	9.14	83.82	35	1.4	0.0040
PV14_5	Paved Road Segment No.14 (5 of 5)	321672.06	3315569.75	17.4	4	9.14	83.82	35	1.4	0.0040
PV11_1	Paved Road Segment No.11 (1 of 3)	321474.13	3315622.25	16.8	4	9.14	76.20	270	1.4	0.0050
PV11_2	Paved Road Segment No.11 (2 of 3)	321397.38	3315631	17	4	9.14	36.58	180	1.4	0.0020
PV11_3	Paved Road Segment No.11 (3 of 3)	321398.91	3315607.5	16.8	4	9.14	15.24	90	1.4	0.0010
PV4_1	Paved Road Segment No.4 (1 of 7)	321298.97	3315471.5	16.8	4	6.10	33.53	-84	1.4	0.0001
PV4_2	Paved Road Segment No.4 (2 of 7)	321261.66	3315476.25	16.8	4	6.10	53.64	0	1.4	0.0001
PV4_3	Paved Road Segment No.4 (3 of 7)	321262.91	3315532	16.8	4	6.10	53.64	0	1.4	0.0001
PV4_4	Paved Road Segment No.4 (4 of 7)	321263.5	3315585.75	16.8	4	6.10	53.64	0	1.4	0.0001
PV4_5	Paved Road Segment No.4 (5 of 7)	321264.13	3315640	16.8	4	6.10	53.64	0	1.4	0.0001
PV4_6	Paved Road Segment No.4 (6 of 7)	321263.5	3315694.5	16.8	4	6.10	53.64	0	1.4	0.0001
PV4_7	Paved Road Segment	321266.56	3315739	16.8	4	6.10	33.53	90	1.4	0.0001

Road Segment Identification	Road Segment Description	Southwest Corner - East, M	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
	No.4 (7 of 7)									
PV12	Paved Road Segment No.12 (1 of 1)	321468.59	3315632.25	16.8	4	9.14	33.53	51	1.4	0.0020
PV13_1	Paved Road Segment No.13 (1 of 5)	321464.31	3315636.5	16.8	4	6.10	45.72	-18	1.4	0.0026
PV13_2	Paved Road Segment No.13 (2 of 5)	321450.88	3315678.75	17.1	4	6.10	45.72	-18	1.4	0.0026
PV13_3	Paved Road Segment No.13 (3 of 5)	321439.88	3315727	17.1	4	6.10	24.38	90	1.4	0.0014
PV13_4	Paved Road Segment No.13 (4 of 5)	321469.81	3315722.75	17.1	4	6.10	33.53	180	1.4	0.0019
PV13_5	Paved Road Segment No.13 (5 of 5)	321469.22	3315689.75	17.1	4	6.10	33.53	180	1.4	0.0019
PV16	Paved Road Segment No.16 (1 of 1)	321409.59	3315598	16.8	4	9.14	45.72	-55	1.4	0.0109
PV17	Paved Road Segment No.17 (1 of 1)	321441.69	3315722	17.1	4	6.10	45.72	-115	1.4	0.0061
PV1C_1	Paved Road Segment No.1C (1 of 9)	321315.84	3315425.75	16.8	4	9.14	74.68	185	1.4	0.0510
PV1C_2	Paved Road Segment No.1C (2 of 9)	321310.19	3315352.5	16.8	4	9.14	74.68	185	1.4	0.0510
PV1C_3	Paved Road Segment No.1C (3 of 9)	321304.22	3315279.75	16.5	4	9.14	74.68	180	1.4	0.0510
PV1C_4	Paved Road Segment No.1C (4 of 9)	321304.69	3315206.5	16.2	4	9.14	74.68	172	1.4	0.0510
PV1C_5	Paved Road Segment No.1C (5 of 9)	321314.53	3315132.5	16.4	4	9.14	74.68	170	1.4	0.0510
PV1C_6	Paved Road Segment No.1C (6 of 9)	321327.22	3315060.25	17.1	4	9.14	74.68	170	1.4	0.0510
PV1C_7	Paved Road Segment No.1C (7 of 9)	321342.25	3314988.25	17.6	4	9.14	74.68	167	1.4	0.0510
PV1C_8	Paved Road Segment No.1C (8 of 9)	321358.69	3314914.25	18.3	4	9.14	74.68	182	1.4	0.0510
PV1C_9	Paved Road Segment No.1C (9 of 9)	321355.63	3314838.5	15.1	4	9.14	74.68	187	1.4	0.0510

Road Segment Identification	Road Segment Description	Southwest Corner - East, M	Southwest Corner - North, m	Base Elevation, m	Release Height, m	East Length, m	North Length, m	Angle of Road Segment from North	Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/h
PV1A_1	Paved Road Segment No.1A (1 of 9)	321477.34	3315426.25	16.1	4	9.14	76.20	200	1.86	0.0510
PV1A_2	Paved Road Segment No.1A (2 of 9)	321452.06	3315355	16.3	4	9.14	76.20	190	1.86	0.0510
PV1A_3	Paved Road Segment No.1A (3 of 9)	321439.56	3315281.75	17	4	9.14	76.20	160	1.86	0.0510
PV1A_4	Paved Road Segment No.1A (4 of 9)	321465.84	3315209.25	17	4	9.14	76.20	170	1.86	0.0510
PV1A_5	Paved Road Segment No.1A (5 of 9)	321478.97	3315134.75	17.4	4	9.14	76.20	155	1.86	0.0510
PV1A_6	Paved Road Segment No.1A (6 of 9)	321512.09	3315065.5	17.1	4	9.14	76.20	160	1.86	0.0510
PV1A_7	Paved Road Segment No.1A (7 of 9)	321540.22	3314992.75	16.6	4	9.14	76.20	160	1.86	0.0510
PV1A_8	Paved Road Segment No.1A (8 of 9)	321565.56	3314920.5	16.6	4	9.14	76.20	170	1.86	0.0510
PV1A_9	Paved Road Segment No.1A (9 of 9)	321582.09	3314843	16.6	4	9.14	76.20	175	1.86	0.0510
PV15_1	Paved Road Segment No.15 (1 of 8)	321718.97	3315639	17.8	4	6.40	64.01	8	1.4	0.0020
PV15_2	Paved Road Segment No.15 (2 of 8)	321727.97	3315702.75	18.1	4	6.40	64.01	8	1.4	0.0020
PV15_3	Paved Road Segment No.15 (3 of 8)	321736.69	3315766.25	18.2	4	6.40	64.01	8	1.4	0.0020
PV15_4	Paved Road Segment No.15 (4 of 8)	321722.25	3315637.25	17.7	4	6.40	50.29	13	1.4	0.0010
PV15_5	Paved Road Segment No.15 (5 of 8)	321733.66	3315686.5	18	4	6.40	50.29	13	1.4	0.0010
PV15_6	Paved Road Segment No.15 (6 of 8)	321745.78	3315735.5	18.2	4	6.40	50.29	13	1.4	0.0010
PV15_7	Paved Road Segment No.15 (7of 8)	321757.22	3315784.5	17.9	4	6.40	50.29	13	1.4	0.0010
PV15_8	Paved Road Segment No.15 (8 of 8)	321748.16	3315836	16.9	4	6.40	21.00	90	1.4	0.0010

TABLE 3-6. STORAGE PILE AND OTHER FUGITIVE CHARACTERISTICS AND OVERAL PM_{10} EMISSIONS

Source Identification in ISCST3 Model	Source Description	East, m	North, M	Base Elevation, m	Release Height, m	Initial Horizontal Dispersion Coefficient, m	Initial Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/hr
UP19	Crusher Loading at the Quarry	322298.63	3315139.25	17.4	4	10.72	1.86	0.5560
UP20	Baserock Loadout	321785.44	3315758.5	17.9	3	9.3	1.4	0.0120
SP2	Base Rock Pile	321838.69	3315723.25	18	3.05	28.93	2.83	0.1890
SP1	Stone Pile	322266.41	3315097.75	16.5	3.05	28.93	2.83	0.2190
SP345FR1	Limestone, Sand & Iron Ore Storage; Raw Material Storage Building	321496.18	3315788.34	17.8	4.1	24	12.5	0.1630
FQ1_CRSH	Quarry Crusher Area: Loading & Primary Crusher Operations	322314.84	3315235.75	17.1	7	0.7	3.26	0.2400
FQ1_B01	Quarry Crusher Area: Conveyor B01	322297.13	3315253.75	17.3	2	0.47	0.93	0.0300
FQ1_B02	Quarry Crusher Area: Conveyor B02	322281	3315273.75	17.5	2	0.47	0.93	0.0300
FQ1_B03	Quarry Crusher Area: Conveyor B03	322264.78	3315294	17.4	2	0.47	0.93	0.0300
FQ1_B04	Quarry Crusher Area: Conveyor B04	322248.44	3315314	17.4	2	0.47	0.93	0.0300
FQ1_B05	Quarry Crusher Area: Conveyor B05	322232.34	3315334	17.1	2	0.47	0.93	0.0300
FQ1_B06	Quarry Crusher Area: Conveyor B06	322216.19	3315354	17.1	2	0.47	0.93	0.0300
FQ1_B07	Quarry Crusher Area: Conveyor B07	322199.97	3315374.25	16.9	2	0.47	0.93	0.0300
FQ1_B08	Quarry Crusher Area: Conveyor B08	322183.5	3315394.5	16.9	2	0.47	0.93	0.0300
FQ2_B08	Quarry Conveyors: B08 to B20	322168.69	3315415	17.8	2	0.47	0.93	0.0300
FQ2_B20	Quarry Conveyors: B20 to B21	322166.56	3315583.5	17.1	2	0.47	0.93	0.0300

Source Identification in ISCST3 Model	Source Description	East, m	North, M	Base Elevation, m	Release Height, m	Initial Horizontal Dispersion Coefficient, m	Initial Vertical Dispersion Coefficient, m	PM_{10} Emission Rate, lb/hr
FQ2_B21	Quarry Conveyors: B21 to B22	322072.34	3315584.25	16.8	2	0.47	0.93	0.0300
FQ2_B22	Quarry Conveyors: B22 to B24 & B22 to B40	321905.56	3315631	17.9	2	0.47	0.93	0.0010
FQ2_B24	Quarry Conveyors: B24 to B27	321910.81	3315683	17.9	2	0.47	0.93	0.0010
FQ2_B27	Quarry Conveyors: B27 to Radial Stacker	321838.88	3315724	18	2	0.47	0.93	0.0010
FQ2_B40	Quarry Conveyors: B40 to C01	321705.63	3315663	17.9	7	0.47	3.26	0.0290
SP6_FR2	Ash Storage; Fly Ash Storage Building	321426.38	3316017.05	18	10.35	12.88	9.63	0.0510
SP7	Gypsum Storage	321425.9	3315597.77	16.8	6.1	6.48	5.67	0.0090
SP8_FF1	Coal Storage; Coal Handling	321386.56	3315708.25	16.8	6.1	6.55	5.67	0.0200
FR3A_01	Raw Storage Bins (Existing)	321359.93	3315891.13	17.6	4.57	2.46	2.13	0.0136
FR3B_02	Raw Storage Bins (New)	321325.03	3315891.34	17.4	4.57	2.46	2.13	0.0146
FR4	Gypsum Transfer	321367.59	3315627.25	16.8	0.3	0.47	0.47	0.0040

the kiln/raw mill baghouse stack for Line 1, E21-01, as a reference point). The distance between each other source and SAC was calculated (in kilometers) and multiplied by 20 (the so-called 20D). This calculation was limited to all PM_{10} sources within about 100 km of SAC (as per the FDEP's provided data base). Each source which remained on this list along with its calculated 20D distance was compared to the annual tonnage of PM_{10}. Those sources with annualemissions greater than 20D were retained and considered in both the PSD modeling and the full NAAQS analysis. For PSD increment consumption, this methodology was conservative as some of the sources in Gainesville may not be PSD increment consuming. Gainesville Power boilers and Florida Rock Cement were considered in the PSD and NAAQS modeling (all Florida Rock sources, current and future, were included in this analysis due to the proximity of the facility and its recent permitting activity).

The sources remaining after the 20D analysis and which were considered in the modeling are presented in Table 3-7 along with their source characteristics and emissions. Appendix A presents the FDEP inventory used in the 20D analysis.

TABLE 3-7. NON-SAC SOURCE PARAMETERS AND EMISSIONS OF PM_{10}

Source Identification[a]	Source description	East, m	North, m
GVDH_E03	Fossil Fuel Fired Steam Generator #1(Phase II AR Unit)	365700	3292600
GVDH_E05	Fossil Fuel Fired Steam Generator #2 (Phase I & II AR Unit)	365700	3292600
FR1_E28	Recycle dust + raw meal to homogenization silo	346357.68	3285761.98
FR1_G07	Recycle dust + raw meal into homogenization silo	346385.85	3285746.8
FR1_H08	Raw meal + recycle dust to preheater	346400.95	3285769.73
FR1_E21	kiln	346417.13	3285766.43
FR1_K15	cooler	346504.41	3285786.83
FR1_L03	Clinker cooler discharge and breaker	346480.22	3285769.25
FR1_L06	Clinker into clinker silos	346546.16	3285781.27
FR1_L08	Clinker into clinker silos	346546.16	3285781.27
FR1_M08	Clinker to finish mill	346554.28	3285707.85
FR1_N09	Finish mill air separator	346567.93	3285692.61
FR1_N12	Finish mill	346567.53	3285697.35
FR1_N91	Cement handling in finish mill	346558.18	3285692.93
FR1_Q25	Cement storage silos	346618.69	3285848.36
FR1_Q26	Cement storage silos	346632.92	3285850.87
FR1_Q14	Cement silo loadout	346619.89	3285840.53
FR1_Q17	Cement silo loadout	346634.3	3285843.04
FR1_Q21	Cement silo loadout	346631.49	3285858.99
FR1_R12	Cement bagging operation	346639.6	3285812.8
FR1_S17	Coal mill	346466.88	3285784.66
FR1_S21	Pulverized coal storage bin	346461.3	3285781.49

[a] GV - Gainesville Municipal Power; FR - Florida Rock Industries

Base elevation, m	Stack height, m	Stack gas temperature, K	Stack gas exit velocity, m/s	Stack diameter, m	PM_{10} Emission rate, lb/hr
16.9	91.44	400.37	14.326	3.3528	288
16.9	106.68	408.15	15.24	5.6388	242.8
16.9	12.192	449.82	20.086	0.67056	0.6999999
16.9	68.6105	366.48	21.425	0.67056	0.9100002
26.1	18.288	366.48	20.446	0.42672	0.3400002
26	76.2	374.82	16.42	2.86512	22.1000001
25.5	60.0151	522.04	12.811	2.7432	7.7000001
25.8	3.109	422.04	20.037	0.3048	0.1500001
25.5	57.912	422.04	20.8	0.33528	0.2000002
25.5	57.912	422.04	20.8	0.33528	0.2000002
25.4	3.109	373.15	20.8	0.33528	0.2199997
25.4	40.8127	372.04	13.876	2.286	5.5599998
25.4	40.8127	372.04	20.409	0.94488	1.3900004
25.3	37.4904	366.48	20.446	0.42672	0.3400002
24.9	79.309	338.71	20.037	0.6096	0.7399997
25.1	79.309	338.71	20.037	0.6096	0.7399997
25	9.205	338.71	20.037	0.3048	0.19
25.1	9.205	338.71	20.037	0.3048	0.19
25	9.205	338.71	20.037	0.3048	0.19
25.5	30.5105	338.71	20.037	0.6096	0.7399997
25.9	50.0177	338.71	20.304	0.73152	1.2500004
25.9	105.601	338.71	20.037	0.3048	0.2199997

SECTION 4

AIR QUALITY MODELING METHODOLOGY

4.1 Model Specification

Dispersion modeling procedures followed U.S. EPA recommended model selection and application protocol and were used throughout this analysis primarily following the *Guideline on Air Quality Models* (April 15, 2003), the personal direction provided by FDEP (Mr. Cleve Holladay), and the U.S. EPA *New Source Review Workshop Manual* (draft, October 1990). This methodology implemented both the new source only analysis and the full impact analysis (detailed modeling and all source consideration). The new source modeling followed the threefold goal of:

- Determining whether the impact analysis can forego further modeling for each PSD pollutant depending on the significant impact analysis and the associated SIA.
- Defining the impact area for which a full impact analysis will be performed.
- Determining other sources and background concentrations that should be included in the analysis.

Based on the review of the pollutants and emission rates associated with the proposed modifications at the facility, dispersion modeling was required for emissions of SO_2, PM_{10}, NO_x, and CO. The level of detail of the modeling for these criteria pollutants depended on the determination of the extent of the significant impact areas for each constituent. Because the significant impact area for PM_{10} lay beyond the facility fence line, modeling was performed also for all SAC sources and other identified interacting and significant sources (from 20D) within about a 75-km radius of the facility.

These other sources included all those within the SIA (there were none) as well as those beyond the SIA with allowable emissions that may cause them to interact with the SAC sources either in terms of PSD increment consumption or NAAQS impacts. Potentially interacting sources were evaluated for inclusion based on the FDEP suggested 20D approach. Two sources were identified for inclusion in the modeling as PSD increment consuming sources: Gainesville Power and Florida Rock Cement. All other sources were beyond the 50 km range generally specified by the *Guideline on Air Quality Models* as the limitation of the short range dispersion models or screened out on a source-by-source basis in the 20D analysis.

4.2 Model Selection

For those pollutants requiring dispersion modeling, the Industrial Source Complex Model (ISC) was used for the modeling. The ISC Model, Version 3, in its short-term mode (ISCST3, Version 02035) was used to perform all preliminary modeling as well as the PSD and NAAQS related full impact modeling. The ISCST3 Model is a steady-state straight-line Gaussian plume model that is recommended by the *Guideline on Air Quality Models*. The ISCST3 Model has many features that make it the most representative model for this analysis including:

- Recommended and accepted by the U.S. EPA
- Multiple sources
- Point, area, and volume source capabilities
- Hour-by-hour meteorological data used in calculations
- User-specified grouped source concentration estimates
- Urban/rural classification
- Building downwash of effluent
- Variable receptor locations.

No other models were used because elevated terrain was not a concern (no terrain above stack height in the vicinity around the plant). Nonetheless, digitized terrain data derived from the 30m DEM data for each applicable USGS quadrangle was used in the ISCST3 modeling to allow the model to perform its full suite of analyses considering the gentle slope of the surrounding terrain. The use of the ISCST3 Model was implemented through the BEE-LINE software called BEEST (Version 9.40).

The selection of the ISCST3 model is consistent with the FDEP guidance provided by Mr. Cleve Holladay in an initial modeling meeting in December 2004. No other air dispersion model was used for this Class II analysis, although one other related model was used to calculate building downwash influence on the plumes. This model was the U.S. EPA *Building Profile*

Input Program (BPIP) (draft user's guide, October 1993). The BPIP Model is included in the BEEST program and was used throughout this analysis.

4.3 Source Identification and Location

Each source was identified in this modeling documentation in Section 3 for all stack, fugitive source, and roadway sources characterization and emissions. Each source has a unique identifier which was used throughout the modeling analysis both in the model and in any tables presenting the concentration estimates. A Cartesian coordinate system in UTM coordinates was assigned to all sources in this analysis. Any other sources that were considered in the modeling for PSD increment purposes or NAAQS impacts were also assigned a unique identification number and had coordinates in the same UTM system as the SAC sources. Only one source was considered for the CO, SO_2, and NO_x SIL and SIA modeling, namely, the new Line 2 Kiln/Raw Mill Baghouse Stack, E21-02. No other new or modified sources emitted these pollutants except the intermittently used emergency backup generator. For PM_{10}, all sources described in Tables 3-1 through 3-8 were considered as appropriate for SIL, PSD, and NAAQS analysis.

4.4 Receptor Locations

Modeling of the individual sources was performed using the ISCST3 Model to determine maximum impact locations. Past modeling for the SAC Line 1 PSD and NAAQS permitting activities was used to select the most representative set of receptors to provide the maximum concentration estimates at a grid resolution commensurate with that recommended by FDEP (at a 100 m resolution in the vicinity of the hot spots). The receptors that were used for the SIL, PSD, and NAAQS analysis included a fence line grid at approximately 50-m intervals and multiple Cartesian grids from the fence line out to about 10 km at grid spacings varying from 100 m near the fence line to 1000-m intervals at the perimeter of the grid. Intermediate spacings of 250, 500, and 1000 m were also used in the modeling. SIL modeling analyses indicated that all maximum impacts occurred within a kilometer of the facility boundaries. Receptors used in the modeling study are shown in Figures 4-1 and 4-2. Terrain elevations were included in all cases for each receptor as derived from the 7.5' USGS maps for the area.

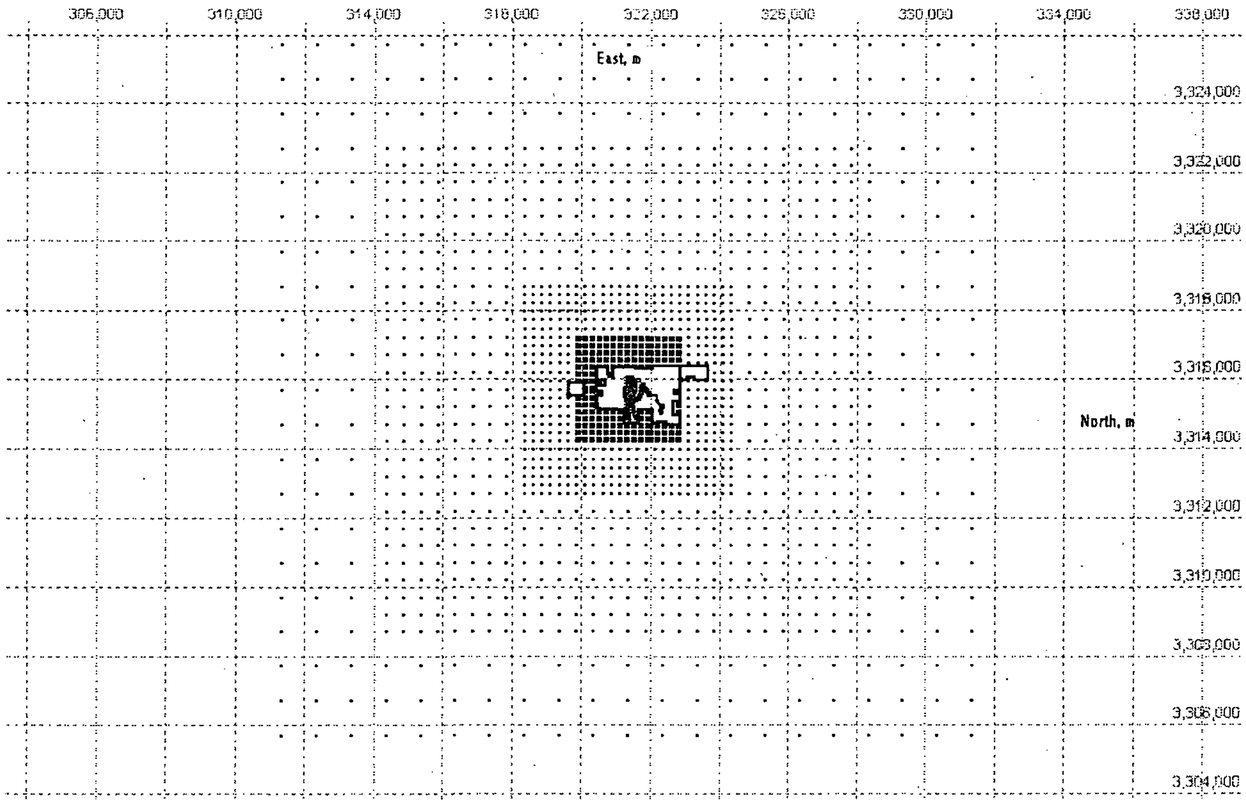

Figure 4-1. Overall Receptor Grid Used for the SAC Air Quality Modeling Analysis

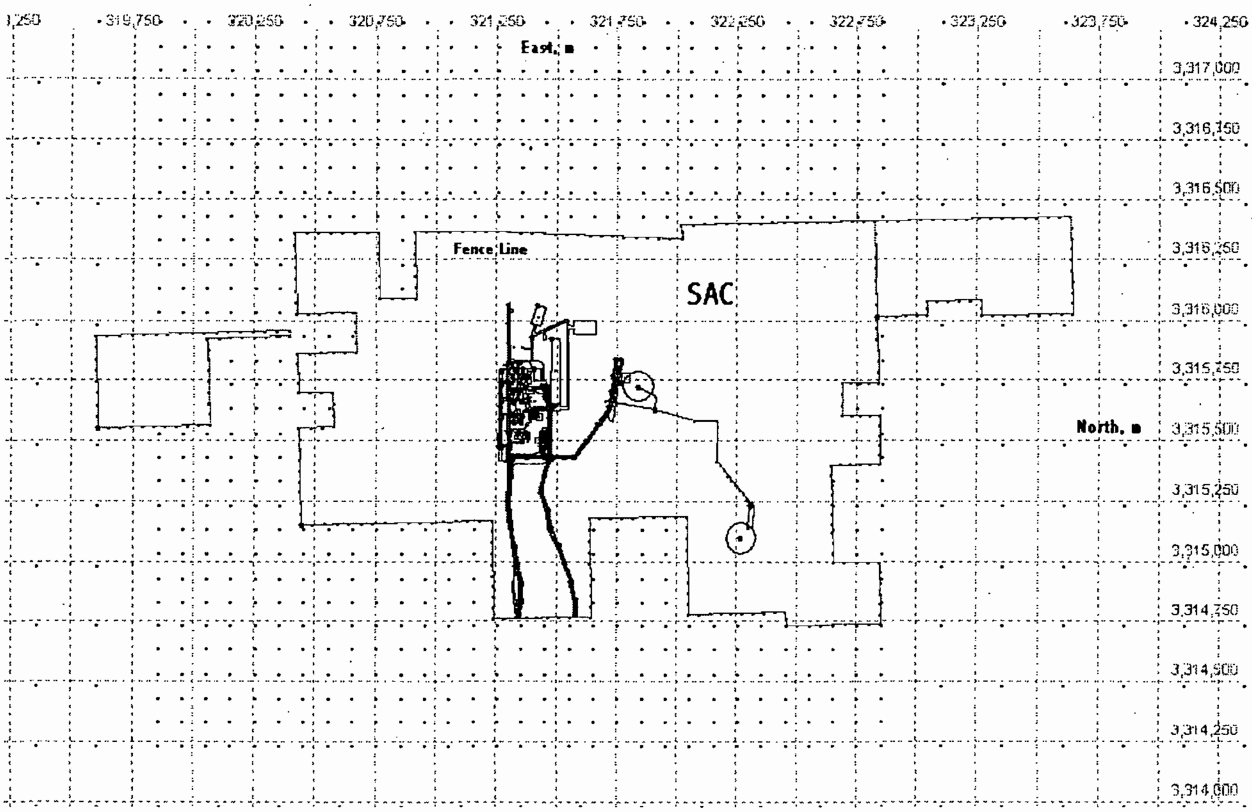

Figure 4-2. Near Field Receptor Grid Used for the SAC Air Quality Modeling Analysis

4.5 Meteorological Data

For the ISCST3 Model, preprocessed meteorological data are required. The *Guideline on Air Quality Models* specifies that five years of representative data be used for an analysis such as this. Data recommended by the FDEP were used to determine the most suitable meteorology for all modeling using the ISCST3 Model. As recommended, this data set consisted of surface meteorological observations for the airport located to the southeast in Gainesville (NWS No. 12816). This data consists of hourly observations of wind speed, wind direction, atmospheric stability class, and temperature. The upper air mixing heights associated with this surface file were obtained from the National Weather Service site in Jacksonville (NWS No. 13889). The most recent 5-year data set readily available from a combination of SCRAM web site data (U.S. EPA), Lakes Webmet site, and previously used data sets for other PSD analyses was for 1992-1996. All sites are similar in both geographical features and vegetative cover, and the combination of the two meteorological sites was deemed representative of the plant site.

4.6 Urban/Rural Classification

To determine whether the area surrounding the facility should be considered urban or rural, a qualitative land-use review was performed. As recommended by the EPA *Guideline on Air Quality Models*, the Auer land-use technique was used to determine if the area is better characterized as rural or urban. Specifically, the guidance recommends land-use analysis of an area within a 3.0-km radius of the site. To be classified "urban," either the population density must be greater than 750 persons per km^2 or, under the Auer technique, greater than 50 percent of the land within 3.0 km of the source must be characterized in one of the following five categories:

- I1 – Heavy Industrial – major chemical, steel, and fabrication industries; generally 3- to 5-story buildings – grass and tree growth extremely rare; <5 percent vegetation.

- I2 – Light Industrial – rail yards, truck depots, warehouses, industrial parks, minor fabrications; generally 1- to 3-story buildings – very limited grass, trees almost totally absent; <5 percent vegetation.

- C1 – Commercial – office and apartment buildings, hotels; > 10-story heights – limited grass and trees; <15 percent vegetation.
- R1 – Compact Residential – single, some multiple, family dwellings with close spacing; generally <2-story buildings; garages, no driveway – limited lawn sizes and shade trees; <30 percent vegetation.
- R3 – Compact Residential – old multifamily dwellings with close lateral separation; generally <2-story buildings; garages, no driveway – limited lawn sizes, old established shade trees; <35 percent vegetation.

Based on an analysis of the 7.5-minute USGS topographic maps for the area and personal surveys by SAC employees, it was determined that greater than 50 percent of the land within the 3.0-km radius consisted of farms and forest lands with only scattered light industrial firms and residences. Therefore, the land-use classification of the area was selected as rural, and rural dispersion coefficients were used in the modeling analysis.

4.7 Model Inputs

The ISCST3 model is very versatile both in terms of the physical phenomena that it can represent and the options that are available for model control and calculations. The regulatory default options of ISCST3 were used throughout all applications of the ISCST3 Model except for the option to allow the use of meteorological data sets that contain missing values. When a missing value is encountered, that hour is skipped and no concentration estimates are made. Table 4-1 presents a summary of the features that are set by the regulatory default option as well as other options selected for this analysis.

4.8 Building Downwash

The effluent plumes from the proposed stacks at the site will be affected by nearby buildings and structures. Because the stacks and building dimensions are such that building downwash of released effluent may cause the plumes to be influenced (which will tend to bring the plume closer to the ground), these effects were included in the analysis.

TABLE 4-1. OPTIONS SELECTED IN THE MODELING OF SAC

Option description
Regulatory defaults except for the missing hour of meteorological data option.
Concentrations in micrograms/cubic meter.
UTM coordinates for fence line and all other receptor locations.
Terrain elevations were considered.
The Rural Mode option was selected.
Default wind profile exponent values were selected.
Default vertical potential temperature gradient values were selected.
The downwind distance plume rise option was used for all sources.
Buoyancy-induced dispersion was used.
The wind system measurement height was set to 10 meters (33 ft).
Building aerodynamic downwash was performed where applicable and will include building information for both Huber-Synder and Schulman-Scire correction.
Stack tip downwash was modeled.
Program control parameters, receptors, and source input data was output.
Concentrations during calm hours were set to zero.
Averaging times were selected consistent with those applicable to the PSD increments, NAAQS, and significant impact concentrations for SO_2, PM_{10}, NO_2, and CO.

The building and stack configuration of the SAC facility was shown in Figure 2-3 for all structures after completion of all modifications. According to the EPA guidance on considering the influence of a building stack, if the stack is less than a Good Engineering Practice (GEP) stack height, the effluent should be treated as if it were affected by the building. GEP stack height is defined as:

$$H_{GEP} = h_b + 1.5L$$

where:

H_{GEP} = Good Engineering Practice stack height (m)

h_b = Nearby structure height

L = The lesser of the nearby structure height or maximum projected width.

In this case, the height of each existing and modified stack was compared to the calculated GEP stack height for each building. A second criterion that was applied to determine if downwash was applicable for each source/building combination was whether the stacks are located downwind and within 5L of the building, upwind and within 2L of the building, or off to the side and within 0.5L of the building. The results of these comparisons for each stack and each building for each of 36 wind directions were tabulated and are presented in Appendix B.

To perform this analysis, the model recommended by the EPA called the Building Profile Input Program (BPIP) was used. The BeeLine version of the BPIP Model within the BEEST was used to generate all downwash calculations.

4.9 Background Concentrations

Background concentrations for each criteria pollutant of concern were available from actual monitored data available from the FDEP through the State's Quick Look report on the FDEP website. Such data was obtained from the State's report for PM_{10}. No other background concentrations were required as all other pollutants had impacts less than their applicable SILs. Review of the nearby sites indicated that the two sites in Gainesville at NW 53rd Avenue and NW 6th Street (shut down after 2000) would be appropriate monitors to use for this analysis. The highest PM_{10} 24-hour concentration was in 2004 at 48 $\mu g/m^3$ and 24 $\mu g/m^3$ in 2000. Discussions indicated that the nearby air monitors are representative of the area surrounding the facility and fulfill the role of preconstruction monitoring; thus, no new preconstruction monitoring was required. These values were used in subsequent NAAQS analysis.

4.10 Reporting

All modeling has been documented in this report, which is part of the permit application. An example printout from ISCST3 and spreadsheets of the 20D analysis are provided in the appendices. Electronic copies of all input and output files of the modeling analysis will be provided to FDEP under a separate cover on a compact disk in ASCII or BEEST formats. One full copy of the model documentation including diskettes will be provided, with additional paper copies of the documentation made available as required.

SECTION 5

RESULTS OF THE CLASS II AMBIENT IMPACT ANALYSIS

5.1 Significant Impact Analysis

The emissions and source characteristics for sources included in the SIL analysis were presented and discussed earlier in this report. The dispersion modeling was performed over a 5-year period of meteorological data using the ISCST3 Model. The highest concentrations of each applicable averaging period (depending on pollutant) were used to determine the maximum significant concentration impacts and significant impact areas. Tables 5-1 through 5-4 present the significant impact analysis results for SO_2, CO, NO_x, and PM_{10}. No other criteria pollutants were required to be modeled.

As shown in Table 5-1 for SO_2 , the highest concentrations are less than the applicable significant levels for the 3-hour, 24-hour, and annual averaging periods for each of the five years of analysis. Thus, the maximum distance to the 3-hour significance level (25 $\mu g/m^3$), the 24-hour significance level (5 $\mu g/m^3$), and the annual significance level (1 $\mu g/m^3$) was within the fence line of the proposed property. No further modeling of SO_2 was required as per the U.S. EPA guidance for PSD modeling analysis.

As shown in Table 5-2 for CO, the highest concentrations are less than the applicable significant levels for both the 1-hour and 8-hour averaging periods for each of the five years of analysis. Thus, the maximum distance to the 1-hour significance level (2,000 $\mu g/m^3$) and the 8-hour significance level (500 $\mu g/m^3$) was within the fence line of the proposed property. No further modeling of CO was required as per the U.S. EPA guidance for PSD modeling analysis.

Significant impact concentrations for NO_2 are presented in Table 5-3. The significant impact concentrations were less than the annual averaging period concentration of 1.0 $\mu g/m^3$. All distances to the significant impact area were within the fence line and no further modeling analysis was required for NO_2.

TABLE 5-1. SUMMARY OF SULFUR DIOXIDE SIGNIFICANT IMPACTS FOR SAC

Year	Highest 3-hour Concentration ($\mu g/m^3$)	Distance to Significant 3-hour Impact (m)	Highest 24-hour Concentration ($\mu g/m^3$)	Distance to Significant 24-hour Impact (m)	Highest annual Concentration ($\mu g/m^3$)	Distance to Significant Annual Impact (m)
1992	3.9	< Fence line	0.97	< Fence line	0.06	< Fence line
1993	4.2	< Fence line	1.0	< Fence line	0.07	< Fence line
1994	3.8	< Fence line	1.0	< Fence line	0.06	< Fence line
1995	4.0	< Fence line	1.8	< Fence line	0.06	< Fence line
1996	5.6	< Fence line	1.6	< Fence line	0.06	< Fence line
Allowable Significant Level	25	Anywhere Offsite	5	Anywhere Offsite	1	Anywhere Offsite

TABLE 5-2. SUMMARY OF CARBON MONOXIDE SIGNIFICANT IMPACTS FOR SAC

Year	Highest 8-hour Concentration ($\mu g/m^3$)	Distance to Significant 8-hour Impact (m)	Highest 1-hour Concentration ($\mu g/m^3$)	Distance to Significant 1-hour Impact (m)
1992	35	< Fence line	120	< Fence line
1993	39	< Fence line	121	< Fence line
1994	34	< Fence line	156	< Fence line
1995	54	< Fence line	122	< Fence line
1996	52	< Fence line	189	< Fence line
Allowable Significant Level	500	Anywhere Offsite	2000	Anywhere Offsite

TABLE 5-3. SUMMARY OF NITROGEN OXIDES SIGNIFICANT IMPACTS FOR SAC

Year	Highest Annual Concentration ($\mu g/m^3$)	Distance to Significant Annual Impact (m)
1992	0.42	< Fence line
1993	0.50	< Fence line
1994	0.42	< Fence line
1995	0.42	< Fence line
1996	0.40	< Fence line
Allowable Significant Level	1.0	Anywhere Offsite

TABLE 5-4. SUMMARY OF PM_{10} SIGNIFICANT IMPACTS FOR SAC

Year	Highest Annual Concentration ($\mu g/m^3$)	Distance to Significant Annual Impact (m)	Highest 24-hour Concentration ($\mu g/m^3$)	Distance to Significant 24-hour Impact (m)
1992	3.4	1600	15.8	2200
1993	3.4	1700	17.6	3000
1994	3.5	1600	18.4	3400
1995	3.5	1700	17.9	2700
1996	3.6	1700	18.9	3100
Allowable Significant Level	1.0	Anywhere Offsite	5.0	Anywhere Offsite

Significant impact concentrations for PM_{10} are presented in Table 5-4. The significant impact concentrations were exceeded for both the annual (1.0 $\mu g/m^3$) and 24-hour (5.0 $\mu g/m^3$) averaging periods. The maximum distance of the significant impact area was 3400 m for the 24-hour period. Because the SIA was beyond the fence line, additional Class II area PSD and NAAQS modeling for PM_{10} was required and is presented in subsequent sections. No other sources or facilities specifically fell within the significant impact area of SAC. A map of the SIA for PM_{10} is shown in Appendix C.

5.2 PM_{10} Increment Consumption Analysis

This analysis included all existing proposed and modified sources at SAC, contemporaneous emission increases, two Gainesville Power boilers, and all Florida Rock sources (current and proposed). No other increment-consuming sources were considered due to distance, insignificance or non-applicability of emissions, or permit lapse.

The increment analysis was performed using the modeling techniques of the ISCST3 Model described earlier in this report. Table 5-5 presents the Class II PM_{10} increment analysis for each applicable averaging period at the highest annual and 24-hour concentrations and the highest second-highest 24-hour concentrations for each year of meteorological data. As can be seen in these tables, the PSD increment impacts do not vary significantly from year-to-year with the controlling value being the highest second highest concentration of 29.6 $\mu g/m^3$ for the year of meteorological data in 1996.

Table 5-6 summarizes the highest increment consumption for each averaging period and pollutant and compares the SAC PSD and all other PSD source impacts to the full PSD increments. As can be seen, the increment consumption is less than the full PSD increment on an annual basis and less than the 24-hour PSD increment when considering the highest second highest concentration.

TABLE 5-5. CLASS II PM_{10} INCREMENT RESULTS – 1992-1996

Year	SAC Highest Annual Concentration, μg/m³	Receptor Location		All PSD Highest Annual Concentration, μg/m³	Receptor Location	
		East, m	North, m		East, m	North, m
1992	6.2	321,234	3315168	6.3	321,234	3315168
1993	6.3	321,234	3315168	6.4	321,234	3315168
1994	6.4	321,234	3315168	6.5	321,234	3315168
1995	6.3	321,234	3315168	6.4	321,234	3315168
1996	6.3	321,639	3315177	6.4	321639	3315177

Year	SAC Highest 24-Hour Concentration, μg/m³	Receptor Location		All PSD Highest 24-Hour Concentration, μg/m³	Receptor Location	
		East, m	North, m		East, m	North, m
1992	29.8	321639	3315177	29.8	321639	3315177
1993	28.4	321684	3315178	28.4	321684	3315178
1994	37.0	321684	3315178	37.0	321684	3315178
1995	35.8	321774	3315180	35.8	321774	3315180
1996	37.1	321774	3315180	37.1	321774	3315180

Year	SAC Highest Second Highest 24-Hour Concentration, μg/m³	Receptor Location		All PSD Highest Second Highest 24-Hour Concentration, μg/m³	Receptor Location	
		East, m	North, m		East, m	North, m
1992	27.7	321,234	3315168	27.7	321,234	3315168
1993	26.8	321642	3315040	26.8	321,642	3315050
1994	26.0	321729	3315179	26.0	321729	3315179
1995	28.5	321639	3315177	28.5	321639	3315177
1996	29.6	321642	3315040	29.6	321642	3315040

TABLE 5-6. PM_{10} PSD INCREMENT CONSUMPTION- SUMMARY

Averaging Period	Combined SAC and Other Source PM_{10} Concentrations, $\mu g/m^3$					Highest Five-Year Concentration, $\mu g/m^3$	PSD Increment, $\mu g/m^3$
	1992	1993	1994	1995	1996		
Annual Maximum	6.3	6.4	6.5	6.4	6.4	6.5	17
24-hr Highest High	29.8	28.4	37.0	35.8	37.1	37.1	30
24-hr Highest Second High	27.7	26.8	26.0	28.5	29.6	29.6	30

a Included Line 1 and 2 sources for all potential emissions. Also included the contributions from other nearby increment consuming sources.

5.3. PM_{10} NAAQS Analysis

The PSD rules require that a demonstration be provided showing that the proposed source emissions when modeled with other sources in the area and adding background do not exceed the NAAQS. Dispersion modeling for a NAAQS impact assessment was required for PM_{10}, which exceeded the SIL for the proposed SAC sources beyond the fence line. Other major sources existing in and near the significant impact area were included in the modeling. The criteria outlined in Section 3 were used whereby the FDEP selects the applicable sources to include in this NAAQS analysis. This included the comparison of the source emissions for each source within about 75 km to the 20D distance. These results are presented in Appendix A, with the sources failing the 20D screening being included in the analysis. The sources remaining after 20D were described and presented in Section 3.

A summary table of the maximum concentration impacts of PM_{10} for all sources included in the NAAQS modeling is presented in Table 5-7 for each year of meteorological data. The maximum annual, highest 24-hour, and highest second-highest 24-hour concentrations are shown in the tables as appropriate. Table 5-8 shows a summary of the highest year impacts (maximum for annual and highest second-high for short-term) combined with the background concentrations. Overall, the impacts for each year for each averaging period for PM_{10} are less than the applicable NAAQS.

TABLE 5-7. PM_{10} NAAQS ANALYSIS – 1992-1996

Year	Highest Annual Concentration	Receptor Location	
	μg/m³	East, m	North, m
1992	6.3	321234	3315168
1993	6.4	321234	3315168
1994	6.5	321234	3315168
1995	6.4	321234	3315168
1996	6.4	321639	3315177

Year	Highest 24-Hour Concentration	Receptor Location	
	μg/m³	East, m	North, m
1992	29.8	321639	3315177
1993	28.4	321684	3315178
1994	37.0	321684	3315178
1995	35.8	321774	3315180
1996	37.1	321774	3315180

Year	Highest Second Highest 24-Hour Concentration	Receptor Location	
	μg/m³	East, m	North, m
1992	27.7	321234	3315168
1993	26.8	321642	3315040
1994	26.0	321729	3315179
1995	28.5	321639	3315177
1996	29.6	321642	3315040

TABLE 5-8. PM_{10} NAAQS IMPACT ANALYSIS - SUMMARY

Averaging Period	Total Baseline and PSD Source Impact, $\mu g/m^3$	Background Concentration, $\mu g/m^3$	Total PM_{10} Concentration, $\mu g/m^3$	NAAQS, $\mu g/m^3$	Percent of NAAQS
24-hour	29.6	48	77.6	150	52
Annual	6.5	24	30.5	50	60

5.4. Additional Impacts Analysis

PSD review requires an analysis of impairment to visibility, soils, and vegetation that will occur as a result of the proposed and modified SAC sources. The review also requires an analysis of the air quality impact projected for the area as a result of general commercial, residential, industrial, and other growth associated with the expansion.

5.4.1 Soils and Vegetation

No sensitive soil types are known to exist within the significant impact area of the SAC facility. 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. Modeling of all the proposed SAC and existing emissions for the PM_{10} NAAQS analysis indicated that the maximum concentrations for all averaging times were less than each applicable NAAQS. Also SO_2, CO, and NO_2 emission impacts were less than the SIL's for these pollutants. Thus, no adverse effects on soils or vegetation are expected.

5.4.2 Related Growth

The construction and modification of SAC is not expected to cause or contribute to related industrial or commercial growth that would have an impact on local ambient air quality.

5.4.3 Visibility

Visibility impacts for the Class I areas were calculated using a long range transport model, i.e., CALPUFF, because all four Class I areas are greater than 50 km from SAC. For consistency of presentation, the visibility impacts are presented in the next section of this report along with other Class I area impacts.

SECTION 6

CLASS I IMPACTS ANALYSIS

Dispersion modeling was performed to demonstrate the impacts of the combined emissions from the operation of the existing and proposed lines at Suwannee American Cement on nearby Class I areas. These areas included Bradwell Bay Wilderness Area, Chassahowitzka Wilderness Area, Okefenokee Wilderness Area, and St. Marks Wilderness Area. The approximate distances from the center of operations of SAC to the nearest edge of each Class 1 area as well as the administrating agency for each area is shown in Table 6-1.

TABLE 6-1. CLASS I AREAS WITHIN 200 KM OF SAC

Class I Area	Federal Land Manager	Distance from SAC to Nearest Class I Receptor, km
Bradwell Bay Wilderness	Forest Service	161
Chassahowitzka Wilderness	Fish & Wildlife Service	133
Okefenokee Wilderness		82
St. Marks Wilderness		110

The modeling for the Class I areas included an analysis of increment consumption in the Class I areas and impacts of the proposed facility (or combined facilities) on other Air Quality Related Values (AQRVs) designated by the Federal Land Managers (FLMs). For the PSD Class I increment consumption analysis, two steps were performed. The first was a modeling analysis to determine if the Line 2 project air quality impacts were greater than the applicable Class I area SILs. For any pollutants resulting in greater than SIL impacts, a multi-source modeling analysis must be conducted to determine the cumulative impact on the Class I PSD increment consumption.

For the AQRVs analysis, the recommendations in the *Interagency Workgroup on Air Quality Modeling (IWAQM) Phase II Summary Report and Recommendations for Modeling Long*

Range Transport Impacts (EPA-454/R-98-019, December 1998) and the *Federal Land Managers' Air Quality Related Values Workgroup (FLAG) Phase I Report* (U.S. Forest Service-Air Quality Program, the National Park Service – Air Resources Division, and the U.S. Fish & Wildlife Service – Air Quality Branch, December 2000) were followed. The AQRVs include those set for visibility impacts and for sulfate and nitrate deposition.

The Class I impacts analyses were combined in this section of the report because of the common application of the CALPUFF Model. CALPUFF was applied in its screening mode, the so-called CALPUFF-lite. The application of CALPUFF-lite was implemented following the guidance offered in *Guide for Applying the EPA Class I Screening Methodology with the CALPUFF Modeling System* (Earth Tech, Inc., September 2001). The methodology is referred to as CALPUFF-lite because it by-passes the need to generate a full three-dimensional wind field using the CALMET meteorological preprocessor. CALPUFF-lite instead uses meteorological data generated by the PCRAMMET Program which generates data for a single meteorological station in the format for the Industrial Source Complex Model (Version 3) in its short-term mode (ISCST3). This single-station generated data set along with the deposition and precipitation variables generated for each hour of the year were used to represent the meteorological field around the facility out to the Class I areas.

6.1 Class I Modeling Protocol

The CALPUFF-lite screening modeling procedure was followed in preparing the Class I impact assessment. A meteorological data set equivalent to that used in the Class II modeling analysis was used for this Class I modeling, namely, the 1992-1996 data for the surface meteorological observations for the airport located to the southeast in Gainesville (NWS No. 12816). This consisted of hourly observations of wind speed, wind direction, atmospheric stability class, and temperature and upper air mixing heights from the Jacksonville International Airport (NWS No. 13889). The meteorological data were prepared in the extended ISCST3 format, including the calculation of wind speed, wind flow direction, temperature, stability class, mixing height, friction velocity, Monin-Obukhov length, precipitation rate, short-wave radiation, and relative humidity.

Receptors for the Class I modeling were downloaded from the National Park Service, Air Resources Division (ARD) website for each of the four Class I areas of interest. The ARD has developed this database of receptors for such modeling analyses for each Class I area in the contiguous U.S. Figure 6-1 shows the four Class I areas with respect to each other as well as to the location of SAC.

For the purpose of determining the maximum potential impact of the existing and proposed SAC sources on the Class I areas, all emissions were assumed to emanate through a single source, namely, the existing kiln/raw mill baghouse stack. Emissions included all fugitives, roadways, storage piles, baghouses, and stacks. This is a very conservative approach for PM_{10}, considering that much of emissions are due to fugitive sources that are emitted near ground level and will have insignificant impacts at distant receptors.

6.2 Class I Increment Consumption

A Class I significant impact analysis was conducted using the CALPUFF-lite modeling technique described above. Tables 6-2 through 6-4 show the impacts on each Class I area for each year of analysis for SO_2, NO_x, and PM_{10}. As can be seen, the air quality impacts in each area are less than the Class I SILs proposed by EPA on July 23, 1996 at 61 FR 38292 (the current Class I SIL's in Florida rules are higher). As can be seen in these three tables, the impacts of the SAC sources are all less than the applicable proposed SILs and thus, no further Class I PSD increment modeling is required.

6.3 Visibility Analysis

The revised IWAQM guidance referenced above recommends the use of non-steady state dispersion modeling for both screening and refined dispersion modeling. The CALPUFF-lite modeling recommendations were used to calculate the visibility impacts of the combined existing and proposed SAC sources. Following the protocol for applying the CALPUFF-lite screening methodology, modeling was performed to evaluate the visibility impacts of the increased SAC emissions at each of the Class I areas. The modeling resulted in the calculation of ground-level air concentrations of visibility impairing pollutants which were subsequently converted to

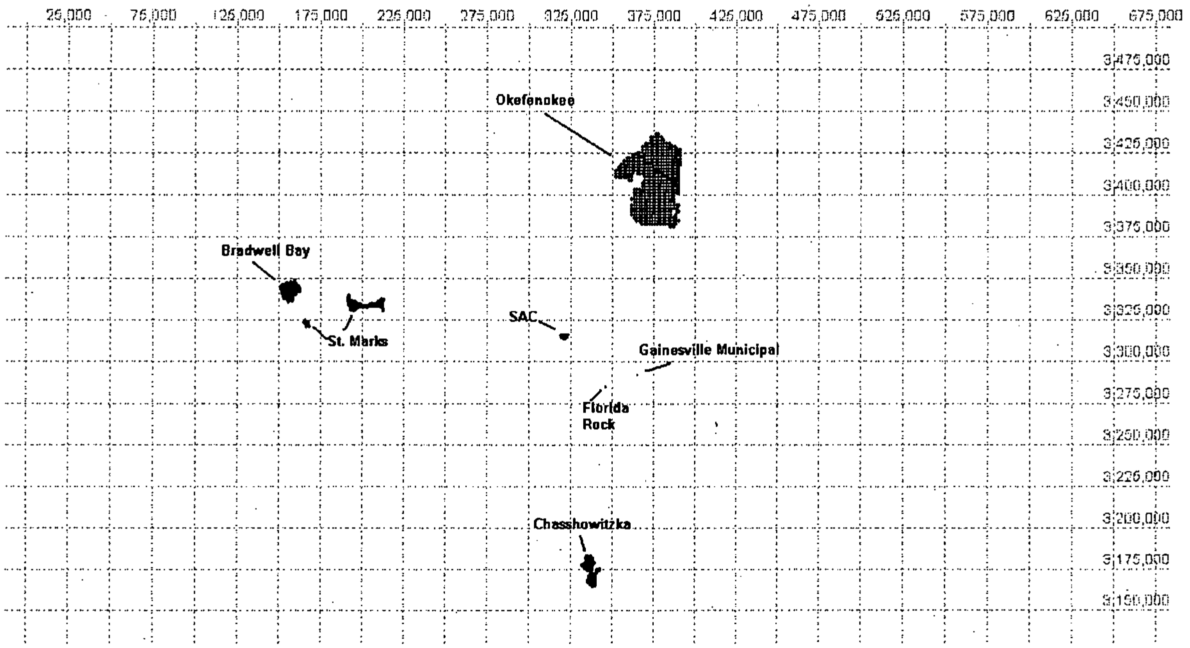

Figure 6-1. Location of Class I Areas Relative to SAC

TABLE 6-2. SUMMARY OF SULFUR DIOXIDE CLASS I SIGNIFICANT IMPACTS

Year	Highest 3-hour Concentration ($\mu g/m^3$)				Highest 24-hour Concentration ($\mu g/m^3$)				Highest annual Concentration ($\mu g/m^3$)			
	Bradwell Bay	Chas	Oke	St Marks	Bradwell Bay	Chas	Oke	St. Mark	Bradwell Bay	Chas	Oke	St Marks
1992			0.2711				0.084				0.0061	
1993												
1994												
1995												
1996												
Proposed EPA SIL	1.0				0.2				0.1			

TABLE 6-3. SUMMARY OF NITROGEN OXIDES CLASS I SIGNIFICANT IMPACTS

Year	Highest Annual Concentration ($\mu g/m^3$)			
Class I Area	Bradwell Bay	Chas	Oke	St. Marks
1992			0.0308	
1993				
1994				
1995				
1996				
Proposed EPA SIL	0.1			

TABLE 6-4. SUMMARY OF PM_{10} CLASS I SIGNIFICANT IMPACTS

Year	Highest Annual Concentration ($\mu g/m^3$)				Highest 24-hour Concentration ($\mu g/m^3$)			
Class I Area	Bradwell Bay	Chas	Oke	St Marks	Bradwell Bay	Chas	Oke	St Marks
1992			0.0085				0.1097	
1993								
1994								
1995								
1996								
Proposed EPA SIL	0.2				0.3			

light-extinction coefficients using the equations in the IWAQM guidance for individual constituents. The total atmospheric extinction was then calculated for all constituents in the modeling including sulfates and nitrates. The resultant extinction coefficient at each receptor at both the nearest and furthest Class I receptor distance to SAC for each Class I area (e.g., 82 km and 134 km for Okefenokee which were modeled every two degrees in all 360 degrees of the compass, regardless of where Okefenokee was located with respect to SAC) due to the increased SAC emissions was compared to the background extinction coefficient. The background extinction coefficient was calculated using the methodology in *Appendix 2.B – Estimate of Natural Conditions* (FLAG 2000 guidance) which was subsequently adjusted in CALPOST post-processing using the daily relative humidities from the meteorological data sets. The analysis was based on 24-hour averages of visibility as recommended by the FLAG guidance.

As per the FLAG and IWAQM guidance, if the percent change in extinction coefficient relative to background is below 5 percent, the FLMs are not likely to object to the project and a cumulative impact assessment would likely not be requested. Table 6-5 presents the results of the visibility calculations for the proposed sources on each Class I area considered. The

TABLE 6-5. CLASS I AREA VISIBILITY IMPAIRMENT ANALYSIS – MAXIMUM PERCENT CHANGE IN EXTINCTION COEFFICIENT

Class I Area	Year of Meteorological Data				
	1986	1987	1988	1989	1990
Bradwell Bay					
Chasshowitzka					
Okefenokee	3.81%				
St. Marks					
Recommended Maximum Extinction Change	5%	5%	5%	5%	5%

increased SAC emissions have a visibility impairment less than 5 percent over a 24-hour period for each year of the modeling for each of the Class I areas. Thus, the visibility impact analysis for the Class I areas using the CALPUFF-lite modeling methodology demonstrated that the impacts to each Class I area were less than the FLAG recommended evaluation criteria of a 5 percent change over the background extinction.

6.4 Class I Deposition Analysis

For the sulfate/nitrate deposition analysis, modeling was performed for the Class I areas following the CALPUFF-lite methodology outlined above. Table 6-6 presents the annual deposition values for each Class I area compared to the Deposition Analysis Threshold (DAT) for sulfur and nitrogen deposition as specified in a letter from the National Park Service and the U.S. Fish & Wildlife Service (to Mr. S. Becker, Executive Director of STAPPA/ALAPCO, January 2, 2002) and as presented in the associated *Guidance on Nitrogen And Sulfur Deposition Analysis Thresholds* (downloaded from the FLM website at www2.nature.nps.gov/air/permits/flag/flaginfo.index.htm). The DAT that was proposed in the Guidance is 0.01kg/ha/yr for both sulfur and nitrogen. This DAT was presented as a "deposition threshold, not necessarily an adverse impact threshold." If all deposition from the increased SAC emissions is less than the applicable DAT, the FLM would likely determine that the SAC modification would not have an adverse impact on the Class I areas. The DAT was deemed applicable to all Class I areas east of the Mississippi River and thus, to each of the four Class I areas included in this analysis. As can be seen in Table 6-6 all deposition rates were less than the DAT for sulfur and nitrogen.

TABLE 6-6. SULFATE/NITRATE DEPOSITION DUE TO INCREASED SAC EMISSIONS

Pollutant	Deposition Rate by Year of Meteorological Data, kg/ha/yr					East U.S. DAT, kg/ha/yr
	1986	1987	1988	1989	1990	
Sulfur	0.0031					0.01
Nitrogen	0.0093					0.01

APPENDIX A

20D ANALYSES FOR SAC -
FDEP INVENTORY AND 20D DISTANCES TO SAC

FINAL PM INVENTORY

Suwannee American Cement (SAC) - Branford, Florida Facility: Florida DEP Point Source Emission Inventory for Potentially Interacting PM_{10} Sources

FACILITY ID	SITE NAME	STATUS	ZONE	NORTH (km)	EAST (km)	EU ID	EU DESCRIPTION	EU STATUS	STACK HT (ft)	DIAM (ft)	EXIT TEMP (F)	ACFM	DSCFM	VEL (ft/s)	POLLUTANT	* POTENTIAL (lb/hr)	* POTENTIAL (tpy)	* ALLOWABLE (lb/hr)	* ALLOWABLE (tpy)	* MAXIMUM (lb/hr)	* MAXIMUM (tpy)	* Overall Maximum TPY	Distance Between Sources (KM)	20 * D (KM)	To Be Modeled YES or NO
0830011	ACTICARB TAILORED PRODUCTS, LLC	A	17	3230	360.2	1	KILN #1 AND #2, Activated Carbon	A	50	1.2	150	3500		51	PM	0.27		.	24.09	0.27	1.1826	24.1	94	1882.384	NO
0830011	ACTICARB TAILORED PRODUCTS, LLC	A	17	3230	360.2	11	Bulk Truck Loading Facility	A							PM	0.0525	0.0475			0.0525	0.22995	0.2	94	1882.384	NO
0010116	ALACHUA COUNTY ANIMAL SERVICES	A				1	ANIMAL CREMATORY	A	35	1.5	1800	3890	745	36.7	PM10	0.32	1.38			0.32	1.4016	1.4	3331	66625.35	NO
7775001	AMERICAN CONCRETE PRODUCTS L.C.	A	17	3329.93	426.65	2	Concrete Block Plant	A							PM	1.361	2.123	.		1.361	5.96118	6.0	106	2124.882	NO
7770270	ANDERSON COLUMBIA CO., INC. PLANT #1	A	17	3343.28	342.63	1	#1 ASPHALT PLANT #255 VIRGIN OR ON-SPEC USED OIL FUEL	A	32	4	337	52500	30100	69	PM	10.32	10.32	10.32	10.32	10.32	45.2016	45.2	35	696.1043	NO
0830135	ANDERSON COLUMBIA CO PLANT # 8	A	17	3231.33	389.51	2	Hot Mix Asphalt Plant # 8	A	23	3.8	200	67000	42504	98.5	PM	14.57	8.09			14.57	63.8166	63.8	108	2169.616	NO
7774812	ANDERSON COLUMBIA, INC #11 PLANT	A	17	3351.2	430.6	1	#11 DRUM MIX ASPHALT PLANT w/ baghouse	A	32	4	340	52500	30100	69	PM	10.32	10.32	10.32	10.32	10.32	45.2016	45.2	115	2297.098	NO
7775042	ANDERSON COLUMBIA, INC.	A	17	3296.15	277.03	1	ASTEC MODEL ACCI HM1166 CRUSHER	A							PM	5.14	5.14			5.14	22.5132	22.5	48	969.2215	NO
7775042	ANDERSON COLUMBIA, INC.	A	17	3296.15	277.03	2	CATERPILLAR MODEL D398 DIESEL ENGINE	A							PM10	5	5			5	21.9	21.9	48	969.2215	NO
7770017	ANDERSON COLUMBIA, INC. #10	A	17	3330.78	259.05	1	#10 ASPHALT BATCH PLANT W/BH	A	23	3.8	275	58255	33480	85	PM	11.5	11.5	11.5	11.5	11.5	50.37	50.4	64	1282.012	NO
0190016	ANDERSON COLUMBIA, INC. #7	A	17	3335.3	400.8	1	#7 ASPHALT PLANT	A	40	3.1	185	32500	30100	71	PM	6.86	3.43	6.86	3.43	6.86	30.0468	30.0	82	1636.315	NO
0750028	ANDERSON MATERIALS COMPANY INC. PLANT #4	A	17	3272.3	314.7	2	No. 2 Ready Mix Concrete Batch Plant	A			77				PM10	9.6	4.98			9.6	42.048	42.0	44	878.7705	NO
7775181	CONCRETE PLANT NO. 7	A	17	3334.2	401.7	1	Concrete Batching Plant	A	17						PM	40	15			40	175.2	175.2	82	1648.73	NO
0030002	ANDERSON MATERIALS COMPANY, INC. #3	A	17	3350.4	392.7	1	CONCRETE BATCH PLANT 45TON REDI-MIX W/BAG COLLECTOR	A	40	1.4	80	650		7	PM	10.32				10.32	45.2016	45.2	79	1586.377	NO
7770237	ANDERSON MINING CORPORATION	A	17	3316	321	2	CAT D33 DIESEL POWER UNIT	A							PM10	0.39	0.71			0.39	1.7082	1.7	0	8.972001	NO
7770237	ANDERSON MINING CORPORATION	A	17	3316	321	3	JOHN DEERE 661980 DIESEL POWER UNIT	A							PM10	0.56	1			0.56	2.4528	2.5	0	8.972001	NO
7770037	APAC-SOUTHEAST INC., FIRST COAST DIV.	A	17	3303.85	393.62	1	300 TPH DRUM MIX ASPHALT CONCRETE PORTABLE PLANT	A	20	4.51	300	66000		68.9	PM			10.22	22.01	10.22	44.7636	44.8	73	1464.624	NO
7775056	APAC-SOUTHEAST, INC. -PLANT NO. 4	A	17	3304.77	468.1	1	DRUM MIX ASPHALT PLANT #4	A	42	4.66	300	64000	31124	62.5	PM10	1.72	2.7			1.72	7.5336	7.5	147	2942.996	NO
7774805	APAC-SOUTHEAST, INC. - FIRST COAST DIV.	A	17	3375.69	247.49	1	RELOCATABLE DRUM MIX ASPHALT PLANT	A	35	3.91	310	58545	35000	81.3	PM	12	24	11.44	11.9	12	52.56	52.6	95	1902.81	NO
0830094	BEDROCK RESOURCES/CITRA MINE	A	17	3252.01	393.47	1	Limestone Quarry with Nonmetallic Mineral Processing Plant	A							PM10		0.9			0	0	0.9	96	1924.616	NO
0830094	BEDROCK RESOURCES/CITRA MINE	A	17	3252.01	393.47	2	Diesel Generator	A			300				PM10	0.66				0.66	2.8908	2.9	96	1924.616	NO
0230043	BLUELINX CORPORATION	C	17	3339.35	346.52	1	CUT-TO-SIZE LUMBER MILL w/ PNEUMATIC COLLECTION SYSTEM	A	60		70	24000	24000		PM10	13.4	58.6			13.4	58.692	58.7	35	690.198	NO
0830131	SEMINOLE STORES	A	17	3229.4	389.7	2	Ingredient & Product Bins	A	60	2	77				PM10		2.5			0	0	2.5	110	2202.138	NO
0830131	SEMINOLE STORES	A	17	3229.4	389.7	4	Grain Cleaning & Cracking	A	70	1.5	77	6500	6305	61.3	PM10	26.41	1.6			26.41	115.6758	115.7	110	2202.138	NO
0830131	SEMINOLE STORES	A	17	3229.4	389.7	5	Grain Flaking (Cooler)	A	70	2.3	87	19000	16720	76.2	PM10	9.74	1.6			9.74	42.6612	42.7	110	2202.138	NO
0830131	SEMINOLE STORES	A	17	3229.4	389.7	7	Animal Feed Pelleting	A	60	2.2	87	19000	16720	83.3	PM10	19.24	11.8			19.24	84.2712	84.3	110	2202.138	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	2	#1 PWR BLR #6 FO/NAT GAS 250 MMBTU COMM STK W/SRC 3,4,19 A1A	A	225	13	325	103200	62900	13	PM	47.9	209.96	47.9	209.96	47.9	209.802	210.0	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	3	#2 PWR BLR #6 FO/NAT GAS 2.5%S250MMBTU COMM STK W/SRC2,4,19P	A	225	13	325	103200	62900	13	PM	47.9	209.96	47.9	209.96	47.9	209.802	210.0	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	4	#1 BARK BLR W/CYCLONE & VENTURI SCRBBR COMM STCK W/SRC 2,3,1	A	225	13	142	100700		12.6	PM	47.25	207	47.25	207	47.25	206.955	207.0	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	6	#2 RECOVERY BOILER W/ ESP & TRS BLOX SYS A	A	225	13	142	100700		12.6	PM	97.6	427.49	97.6	427.49	97.6	427.488	427.5	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	7	#3 RECOVERY BOILER W/1 dry ESP & BLOX A	A	225	9	310	228600		59	PM	82.35	359.7	82.35	360.69	82.35	360.693	360.7	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	11	#4 RECOVERY BLR.LOW ODOR DESIGN,ELECTROSTATIC PREC.FOR PM CO	A	225	9.5	438	332700	143500	78	PM	113.4	496.69	113.4	496.69	113.4	496.692	496.7	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	19	#2 BARK BOILER W/CYCLONE & SCRUBBER, COMMON STACK A	A	225	13	200	265000		33	PM	106.73	467.48	106.73	467.48	106.73	467.4774	467.5	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	21	#2 SMELT DISSOLVING TANK FOR #2 RB W/WET SCRUBBER	A	142	3	171	16500	8700	38	PM	25.1	113.6	25.9	113.6	25.9	113.442	113.6	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	22	#3 SMELT DISSOLVING TANK FOR #3 RB W/WET SCRUBBER	A	140	4	165	21800	12000	28	PM	24.1	105.3	24.05	105.34	24.1	105.558	105.6	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	23	#4 SMELT DISSOLVING TANK W/WET SCRUBBER CONTROL	A	162	4	165	28500	14250	35	PM	29.1	128.5	30.19	132.22	30.19	132.2322	132.2	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	24	#4 LIME KILN W/ ESP FOR PM & TRS CEMS A	A	100	6.5	290	108000	45060	54	PM	56.2	246.16	20	87.6	56.2	246.156	246.2	66	1318.936	NO
1230001	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	A	17	3328.7	256.7	25	2 LIME SLAKERS W/ SCRUBBER	A	133	1.7	141	657	461	4	PM	2.06	9.13	2.08	9.13	2.08	9.1104	9.1	66	1318.936	NO
0010120	BUSBY CABINETS	A				1	Surface coating operations	A							PM		0.57			0	0	0.6	3331	66625.35	NO
7770001	CA MATERIALS, INC./WESTSIDE CONCRETE PRD	A	17	3288.71	369.5	1	ASPHALT BATCH PLT W/CYCLONE & ASTEC RBH-67:TDB BAGHOUSE	C	25	4	300	70000	40000	92.8	PM	37.24	37.24	37.24	37.24	37.24	163.1112	163.1	55	1104.118	NO
0010013	GAINESVILLE CONCRETE READYMIX PLANT	A	17	3279	370.2	1	CONCRETE BATCH PLANT, 2 DUST COLLECTORS SERVING 4 SILOS	A	45	4	68	1178		1	PM	129.23				129.23	566.0274	566.0	61	1222.229	NO
0830026	SOUTHDOWN/OCALA PLANT	A	17	3227.4	390.5	1	CONCRETE BATCH PLANT SILO #1 W/BAGHOUSE CONTROL	A	55	1	80	110		2	PM10		1.3			0	0	1.3	112	2243.465	NO
0830026	SOUTHDOWN/OCALA PLANT	A	17	3227.4	390.5	3	CONCRETE BLOCK CEMENT STORAGE SILO W/BAGHOUSE	A	50	4	80	1000		1	PM	0.83	0.83			0.83	3.6354	3.6	112	2243.465	NO
0830026	SOUTHDOWN/OCALA PLANT	A	17	3227.4	390.5	4	FLY ASH SILO W/BAGHOUSE CONTROL	A	63	4.1	80	1000		1	PM	1.8	2.34			1.8	7.884	7.9	112	2243.465	NO
0010056	CENTRAL FL CREMATORIUM AKA MILAM FUNERAL	A	17	3280.3	371.8	1	CREMATOR FOR HUMAN REMAINS	A	17	1.7	588	2092		15	PM	0.212	0.93	0.212	0.93	0.212	0.92856	0.9	62	1232.826	NO
0830023	CENTRAL FLORIDA AGGREGATE, INC.	A	17	3214.1	375	1	ASPHALT PLANT (DRUM MIX)	A	35	4	150	29000	19800	38	PM	0.9		8.28	12.9	8.28	36.2664	36.3	115	2298.366	NO
0830150	CENTRAL FLORIDA PET CREMATORY	C				1	Crawford C500P Animal Cremator Unit	C	15	1	900	1668	650	35.4	PM		2.86			0	0	2.9	3331	66625.35	NO
0010103	CHERISHED MEMORIES INC	A	17	3296.35	356.84	1	Animal Crematory	A	10	1.5	900	1350	425	12.7	PM	0.091	0.142			0.091	0.39858	0.4	40	808.5851	NO
0010006	DEERHAVEN GENERATING STATION	A	17	3292.6	365.7	3	Fossil Fuel Fired Steam Generator #1(Phase II AR Unit)	A	300	11	261	272000		47	PM	288	526	98	526	288	1261.44	1261.4	50	1000.233	YES
0010006	DEERHAVEN GENERATING STATION	A	17	3292.6	365.7	5	Fossil Fuel Fired Steam Generator #2 (Phase I & II AR Unit)	A	350	18.5	275	806407		50	PM	242.8	1064	242.8	1064	242.8	1063.464	1064.0	50	1000.233	YES
0010006	DEERHAVEN GENERATING STATION	A	17	3292.6	365.7	6	Simple Cycle Comb Turbine No. 3 (Phase II Acid Rain Unit)	A	52	14.1	1100	1573615		168	PM10	15	22	15	15	15	65.7	65.7	50	1000.233	NO
0830052	CLOSETMAID	A	17	3228.9	386.2	2	B-Coater Line (aka Coating Line #4)	A	36	2.6	120	13315		41.8	PM		20.19			0	0	20.2	108	2167.393	NO
0830052	CLOSETMAID	A	17	3228.9	386.2	3	C-Coater Line	A	28	2	600	3200		17	PM		0.66			0	0	0.7	108	2167.393	NO
0830052	CLOSETMAID	A	17	3228.9	386.2	6	Two Burn-off Ovens	A	29	1.3	1400	1531		19.2	PM	.	0.12			0	0	0.1	108	2167.393	NO
0830052	CLOSETMAID	A	17	3228.9	386.2	7	Wastewater Evaporator	A			200				PM		0.18			0	0	0.2	108	2167.393	NO
0190070	COASTAL MARINE INC	A	17	3317.74	436.18	2	Sand Blasting	A			77				PM10	1.78	7.8			1.78	7.7964	7.8	115	2296.771	NO
0230026	COLUMBIA READY MIX CONCRETE, INC.	A	17	3342.9	341.6	1	R/M CONCRETE BATCH PLANT W/BAG FILTER ON EACH OF 2 SILOS	A	40	2.8	70	450		1	PM	32.42				32.42	141.9996	142.0	34	677.5995	NO
0830001	COUNTS CONSTRUCTION COMPANY, INC.	A	17	3231.4	385.9	1	ASPHALT BATCH PLANT DRYER	A	35	2.5	300	42000	21592	142	PM10		0.36			0	0	0.4	106	2123.889	NO
0290008	CROSS CITY VENEER COMPANY, INC.	A	17	3279.6	295.2	3	Carbonaceous fuel steam boiler	A	50	1.94	300	7600	4000	42.9	PM	5.6	24.3			5.6	24.528	24.5	45	892.1306	NO
0830128	DAMAR MANUFACTURING	A	17	3229.92	386.15	2	Wood Waste Transport System	A	26	3.2	77	20000		41.5	PM		1			0	0	1.0	108	2150.479	NO
0830007	MARK IV DAYCO	A	17	3226.2	393.3	1	RUBBER MIXING PROCESS	A							PM	0.4	20.19	7.1	31	7.1	31.098	31.1	115	2297.068	NO
0830007	MARK IV DAYCO	A	17	3226.2	393.3	2	FOUR STEAM BOILERS	A	24	2	300	4256		22	PM10		1.79			0	0	1.8	115	2297.068	NO
0830007	MARK IV DAYCO	A	17	3226.2	393.3	3	CURING AND INTERNAL HOSE MAKING OPERATIONS	A	24	1.7	160	4500		33	PM10		2.5			0	0	2.5	115	2297.068	NO
1070040	CRESCENT CITY MILL	A	17	3253.9	448.25	1	(5) cyclones located on storage bins	A							PM	24.4	53.29			24.4	106.877	106.9	141	2823.076	NO
0830069	DELTA LABORATORIES/OCALA	A	17	3238	385	1	PAINT PRODUCTION	A	10	2.5	60	25000		84	PM	4.4	5.7			4.4	19.272	19.3	100	2009.207	NO
0830091	CUMMER LIMESTONE MINE	A	17	3238	386.7	1	CUMMER LIMESTONE MINE	A							PM		10.5			0	0	10.5	102	2030.917	NO
0190011	E.I. DUPONT DE NEMOURS & CO - TRAILRIDGE	A	17	3308.58	400.23	1	#1 DRYER ILMENITE W/CYCLONE	A	33	2	200	25108	17073	133	PM	4.4	19.2	4.4	19.2	4.4	19.272	19.3	79	1583.89	NO
0190011	E.I. DUPONT DE NEMOURS & CO - TRAILRIDGE	A	17	3308.58	400.23	2	ZIRCORE DRYER W/ DUCON 185 VM TYPE MODEL 700 CYCLONE <2.8%S	A	40	1.3	3000	5000		62.8	PM	9.12	39.95	9.12	39.95	9.12	39.9456	40.0	79	1583.89	NO
0190011	E.I. DUPONT DE NEMOURS & CO - TRAILRIDGE	A	17	3308.58	400.23	3	ZIRCON KILN ROTARY W/CYCLONE #6F0 2.8%S 20.5MMBTU/H, 18TPH	A	40	1.5	270	20738	13200	195.6	PM	21.5	94.4	21.54	94.37	21.54	94.3452	94.4	79	1583.89	NO
0070001	E.I. DUPONT DE NEMOURS & CO INC HIGHLAND	A	17	3325	398.7	1	DRYER ROTARY ILMENITE W/CYCLONE A	A	35	3.2	255	17000	10295	35	PM	33.2	145.6	33.2	145.42	33.2	145.416	145.6	78	1557.889	NO
0010002	FRED BEAR ARCHERY EQUIPMENT	A	17	3276.5	365.71	1	ARCHERY MFG FACILITY W/ BAGHOUSE	A			77	69210		840	PM10	-	29.93			0	0	29.9	59	1184.244	NO
0830067	EVANS SEPTIC TANK & READYMIX INC.	A	17	3216.1	397.3	1	CEMENT SILO & FLYASH SILO	A	75	6		500		0.3	PM		1.4			0	0	1.4	125	2505.464	NO
1070001	FELDSPAR CORP/EDGAR PLASTIC KAOLIN DIV	A	17	3274.2	407.8	1	#2 SAND DRYER NAT GAS CYCLONE Z NO FO LINES;43 THERM 18WET T	A	20	1.4	150		1956	32	PM	23		4.52	15.82	23	100.74	100.7	96	1918.006	NO
1070001	FELDSPAR CORP/EDGAR PLASTIC KAOLIN DIV	A	17	3274.2	407.8	3	DRYER KAOLIN CLAY NATGAS/#2FO/LPG DORR/OLIVER	A	31	2	237	17838		94	PM	3	13.14	3	13.14	3	13.14	13.1	96	1918.006	NO
1070001	FELDSPAR CORP/EDGAR PLASTIC KAOLIN DIV	A	17	3274.2	407.8	4	#1 SAND DRYER PROPANE NAT GAS #2FO WET CYCLONE 400 THE	A	51	3.3	200	24000		46	PM	10	10	10	10	10	43.8	43.8	96	1918.006	NO
1210019	FL DEPT OF AGRICULTURE - LIVE OAK DIV.	A	17	3354.38	309.88	1	ANIMAL CREMATORY <=500 LB/HR)	A	20	1.5	1600	1668	650	15.7	PM	0.045	1.62	0.36	1.58	0.36	1.5768	1.6	41	812.2735	NO
0830084	FLAIR MANUFACTURING	A	17	3224.09	385.67	2	SANDBLASTING OPERATION, (2) SANDBLAST STATIONS	A							PM	0.023				0.023	0.10074	0.1	112	2239.105	NO
0190032	FLORIDA ARMY NATIONAL GUARD - CAMP BLNDG	A	17	3312.01	405.02	1	ASPHALT PLANT W/ BAGHOUSE	A	21	3.1	300	41500	22500	91	PM	7.71	7.49	7.71	7.49	7.71	33.7698	33.8	84	1674.874	NO

Suwannee American Cement (SAC) - Branford, Florida Facility: Florida DEP Point Source Emission Inventory for Potentially Interacting PM_{10} Sources

FACILITY ID	SITE NAME	STATUS	ZONE	NORTH (km)	EAST (km)	EU ID	EU DESCRIPTION	EU STATUS	STACK HT (ft)	DIAM (ft)	EXIT TEMP (F)	ACFM	DSCFM	VEL (ft/s)	POLLUTANT	* POTENTIAL		* ALLOWABLE		* MAXIMUM		* Overall Maximum TPY	Distance Between Sources (KM)	20 * D (KM)	To Be Modeled YES or NO
																(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)				
0830155	FLORIDA CREMATION SOCIETY	C	17	3228.4	390.36	1	Human Cremator- IEE Power Pak II	C	17	1.7	1000	2200	657	16.2	PM	0.45	2	0.45	2	0.45	1.971	2.0	111	2226.014	NO
0070012	BRADFORD CO STATION #16	A	17	3310.8	371.9	2	Unit 1606 - one 4000 bhp gas-fired recip IC engine	A	66	2.5	550	30138	14487	102	PM10	1.68	7.36	1.68	6.75	1.68	7.3584	7.4	51	1016.016	NO
0070012	BRADFORD CO STATION #16	A	17	3310.8	371.9	3	Gas Turbine Compressor (FGT Unit No. 1607)	A	61	7.17	965	96903		40	PM10	0.4	1.8			0.4	1.752	1.8	51	1016.016	NO
0410004	FGTC STATION 24, GILCHRIST COUNTY	A	17	3282.79	321.32	1	FGTC Engine - 15,000 bhp gas turbine compressor engine	A	58	8.74	903	193613		53.8	PM10	0.8	3.5			0.8	3.504	3.5	33	658.8205	NO
0410004	FGTC STATION 24, GILCHRIST COUNTY	A	17	3282.79	321.32	3	FGTC Engine 2402 - 7222 bhp gas turbine compressor engine	A	61	7.2	960	98000		40.1	PM10	0.4	1.75			0.4	1.752	1.8	33	658.8205	NO
0830070	FGTC STATION 17, MARION COUNTY	A	17	3240.9	418.8	1	FGTC Engine 1701 - 2000 bhp RICE compressor engine	A	28	1.3	875	11760	4279	147	PM10		0.33			0	0	0.3	123	2457.188	NO
0830070	FGTC STATION 17, MARION COUNTY	A	17	3240.9	418.8	2	FGTC Engine 1702 - 2000 bhp RICE compressor engine	A	28	1.3	875	11760	4279	147	PM10		0.33			0	0	0.3	123	2457.188	NO
0830070	FGTC STATION 17, MARION COUNTY	A	17	3240.9	418.8	3	FGTC Engine 1703 - 2000 bhp RICE compressor engine	A	28	1.3	875	11760	4279	147	PM10		0.33			0	0	0.3	123	2457.188	NO
0830070	FGTC STATION 17, MARION COUNTY	A	17	3240.9	418.8	4	FGTC Engine 1704 - 2000 bhp RICE compressor engine	A	28	1.3	875	11760	4279	147	PM10		0.33			0	0	0.3	123	2457.188	NO
0830070	FGTC STATION 17, MARION COUNTY	A	17	3240.9	418.8	5	FGTC Engine 1705 - 2400 bhp RICE compressor engine	A	40	1.3	695	14355	6036	180	PM10		0.4			0	0	0.4	123	2457.188	NO
0830070	FGTC STATION 17, MARION COUNTY	A	17	3240.9	418.8	8	FGTC Engine 1706 - 15,700 bhp gas turbine compressor engine	A	61	7.6	910	215200		79.1	PM10	0.9	3.9			0.9	3.942	3.9	123	2457.188	NO
1230034	FL GAS-STATION 15	A	17	3339.6	249	2	#8 RECIPROCATING I.C. ENGINE, 4000 BHP NATURAL GAS FIRED	A	68	2.5	550	30138	14487	102	PM	0.13	0.57	0.13	0.6	0.13	0.5694	0.6	76	1523.884	NO
1230034	FL GAS-STATION 15	A	17	3339.6	249	4	7222 bhp gas turbine compressor engine (FGT Unit 1508)	A	61	7.17	958	98427			PM10		2.08			0	0	2.1	76	1523.884	NO
1230034	FL GAS-STATION 15	A	17	3339.6	249	6	15,000 bhp gas turbine compressor engine	A	80	8.5	910	191800		56.3	PM10	0.8	3.5			0.8	3.504	3.5	76	1523.884	NO
0750029	FLORIDA ROCK GULF HAMMOCK QUARRY	A	17	3235.9	334.1	1	LIMESTONE QUARRY	A							PM10	3.39	14.83			3.39	14.8482	14.8	81	1616.827	NO
0750029	FLORIDA ROCK GULF HAMMOCK QUARRY	A	17	3235.9	334.1	2	PRIMARY PLANT AND COMMERCIAL PLANT	A			77				PM10	3.45	14.63			3.45	15.111	15.1	81	1616.827	NO
0750029	FLORIDA ROCK GULF HAMMOCK QUARRY	A	17	3235.9	334.1	3	FINISHING PLANT AND ROOT ELIMINATOR SYSTEM	A							PM10	1.79	7.85			1.79	7.8402	7.9	81	1616.827	NO
0750029	FLORIDA ROCK GULF HAMMOCK QUARRY	A	17	3235.9	334.1	4	SAND PLANT	A							PM10	0.13	0.5699			0.13	0.5694	0.6	81	1616.827	NO
0750029	FLORIDA ROCK GULF HAMMOCK QUARRY	A	17	3235.9	334.1	5	AGLIME PLANT	A							PM10	0.04	0.16			0.04	0.1752	0.2	81	1616.827	NO
0750029	FLORIDA ROCK GULF HAMMOCK QUARRY	A	17	3235.9	334.1	7	ACCESS ROADS	A							PM10	0.69	3.03			0.69	3.0222	3.0	81	1616.827	NO
0890016	FL ROCK - YULEE PLANT	A	17	3388.8	441.2	1	CONCRETE BATCHING PLANT W/BAGHOUSE ON EACH SILO	A	25	0.7	77	700		30	PM	27.49				27.49	120.4062	120.4	140	2807.201	NO
0010061	FLORIDA ROCK INDUSTRIES INC-HIGH SPRINGS	A	17	3299.4	347.3	1	CONCRETE BATCH PLANT TWO SILOS EACH WITH A BAGHOUSE	A	48	1.2	80	650		9	PM	3.67				3.67	16.0746	16.1	31	613.07	NO
0010087	THOMPSON S. BAKER CEMENT PLANT	A	17	3287.04	348.35	[illegible]	Kiln/Raw Mill System Stack [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	PM10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	787.8293	See Note (d)
0010087	THOMPSON S. BAKER CEMENT PLANT	A	17	3287.04	348.35	[illegible]	Clinker Cooler & Handling [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	PM10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	787.8293	See Note (d)
1070022	FLORIDA ROCK -COMFORT RD	A	17	3284.4	436.1	1	CONCRETE BATCH PLANT (READY MIX) W/BAGHOUSE	A	13	1.8	77	9685		63	PM	16.54				16.54	72.4452	72.4	119	2378.834	NO
0070011	FLORIDA ROCK INDUSTRIES, INC. BRADFORD	A	17	3313.1	393.1	1	R/M CONCRETE PLANT; CEMENT SILO & FLYASH (PARK) W/A BAGHOUSE	A	57	2.5	77	243			PM	25.08				25.08	109.8504	109.9	72	1435.785	NO
1070007	FLORIDA ROCK INDUSTRIES, INC. KEUKA PLT	A	17	3274.2	411.3	1	SAND DRYER 50.7 TPH #2 FO FLUID-BED W/VENT-ROD SCRBBR	A	30	2.5	132	19300		65	PM	4.9		4.9	21.46	4.9	21.462	21.5	99	1981.334	NO
1090018	FLORIDA ROCK INDUSTRIES, INC. ST. JOHNS	A	17	3304.6	467.8	1	CONCRETE BATCH PLANT W/BAGHOUSE TO CONTROL SILO, HOPPER, TRU	A	40	2	90	6000	5645	31	PM	6.77				6.77	29.6526	29.7	147	2937.269	NO
1090015	FLORIDA SCHOOL FOR THE DEAF & THE BLIND	A	17	3309.1	469.4	1	#1 STEAM BOILER 29.4 MMBTU; #2 FO 0.5%S.	A	45	3	520	9190		21	PM	2		0.6	2.63	2	8.76	8.8	148	2963.789	NO
1090015	FLORIDA SCHOOL FOR THE DEAF & THE BLIND	A	17	3309.1	469.4	3	#2 STEAM BOILER 29.4 MMBTU; 1/2 TIME OPERATION, #2 FO 0.5%S	A	40	3	595	23134	10368	54	PM			0.54	0.54	0.54	2.3652	2.4	148	2963.789	NO
0230032	FOREST LAWN MEMORIAL GARDENS	A	17	3332.65	342.91	1	HUMAN CREMATORY	A	19	1.7	1033	3212	1047	23	PM	0.288	1.26	0.288	1.26	0.288	1.26144	1.3	27	547.9774	NO
0010057	FOREST MEADOWS FUNERAL HOME, INC.	A	17	3283.8	371.4	1	CREMATOR TO BURN HUMAN REMAINS & APPROPRIATE CONTAINERS	A	15	1.7	1147	3176	935	23	PM10	0.8	3.504			0.8	3.504	3.5	59	1187.214	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	1	86" RAYMOND MILL	A	98	1.3	70	3500		43	PM	0.514	2.25		2.25	0.514	2.25132	2.3	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	2	Granular Dry System CRUSHING SCREENING CONVEY DUST COLLECT	A	36	2	100	48700		258	PM10	2.55	11.16			2.55	11.169	11.2	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	3	LIMESTONE BAGGING SYSTEM WITH BAGHOUSE	A	48	2	120	6900		47	PM	0.857	3.75			0.857	3.75366	3.8	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	4	Granular WET SYSTEM WITH CYCLONE & SCRUBBER CONTROLS	A	34	2	130	12500		66	PM	2.1	9.198		9.198	2.1	9.198	9.2	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	5	LIMESTONE FLUIDIZED BED DRYER W/BAGHOUSE	A	39	4.5	220	45000		47	PM	7.2	31.536		55	7.2	31.536	55.0	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	6	LIMESTONE ROTARY DRYER	A	35	2.6	150	35442		111	PM	32.05	140.4	24		32.05	140.379	140.4	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	7	Fine Grind Loadout	A	17	1.7	160	2400		17	PM	0.171	0.75			0.171	0.74898	0.8	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	8	73" RAYMOND MILL	A	98	1.3	70	2800		35	PM	0.514	2.25		2.25	0.514	2.25132	2.3	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	9	TRUCK BLOW-OFF BIN & BAGHOUSE	A	42	0.7		640	570	27	PM	0.0977	0.428			0.0977	0.427926	0.4	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	11	Granular LOADOUT D-2 AREA	A	120	3	200	10000	9750	23	PM	1.714	7.51		7.51	1.714	7.50732	7.5	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	12	Silo 5	A	12	3	80	10000		23	PM	0.857	3.75		3.75	0.857	3.75366	3.8	96	1910.892	NO
0830016	FRANKLIN INDUSTRIAL/LOWELL	A	17	3244.2	384.7	13	BALL MILL & FEED SILO	A	65	1.3	275	4455		55	PM	1.354	5.93		5.93	1.354	5.93052	5.9	96	1910.892	NO
0010005	JOHN R KELLY POWER PLANT	A	17	3280.1	372.1	7	Fossil Fuel Fired Steam Generator Unit No. 7	A	200	10.5	337	207750		40	PM	24.9	136.33	24.9	136.33	24.9	109.062	136.3	62	1240.035	NO
0010005	JOHN R KELLY POWER PLANT	A	17	3280.1	372.1	10	Combined-Cycle Unit No. 1 (CC-1)	A	102	15.5	242	704482		62.2	PM10	10	21.9	10	5	10	43.8	43.8	62	1240.035	NO
0010117	MICANOPY FACILITY	C	17	3263.65	377.83	1	Animal Crematory	C	15	1.5	1150	2100	700	19.8	PM	0.007	0.293	0.26	1.14	0.26	1.1388	1.1	77	1536.412	NO
0290003	GEORGIA-PACIFIC CORP. CHIP/SAW	A	17	3278.8	300.3	7	No. 1 Direct-Fired Lumber Kilns	A	26	2	240	42846	15842	227.3	PM	3.33	11.6			3.33	14.5854	14.6	43	850.2659	NO
0290003	GEORGIA-PACIFIC CORP. CHIP/SAW	A	17	3278.8	300.3	8	DK-2 (DIRECT-FIRED LUMBER KILN)	A	25	4.8	240	42846	15842	39	PM	3.33	11.6			3.33	14.5854	14.6	43	850.2659	NO
0290003	GEORGIA-PACIFIC CORP. CHIP/SAW	A	17	3278.8	300.3	10	#3 DFKiln w/ 16 vents(EP 10-1)&burner vent(EP 10-2)	A	26	1.9	240				PM	4.03	14			4.03	17.6514	17.7	43	850.2659	NO
0290003	GEORGIA-PACIFIC CORP. CHIP/SAW	A	17	3278.8	300.3	12	Sawmill, Planer Mill, and miscellaneous facility fugitives	A							PM		19.9			0	0	19.9	43	850.2659	NO
1070015	GEORGIA-PACIFIC CORP. PLYWOOD PLANT	A	17	3273.8	399.6	1	BOILER WOOD/BARK W/ ESP	A	60	6	355	99100		58	PM	33.6	146.76	33.6	146.76	33.6	147.168	147.2	89	1775.372	NO
1070015	GEORGIA-PACIFIC CORP. PLYWOOD PLANT	A	17	3273.8	399.6	2	CONVEYING SYSTEM(SKINNER SAW & GLUE LINE EACH W/ A CYCLONE)	A	85	3.1	77	42014		92	PM	11.7	51.2	11.7	51.2	11.7	51.246	51.2	89	1775.372	NO
1070015	GEORGIA-PACIFIC CORP. PLYWOOD PLANT	A	17	3273.8	399.6	3	CONVEYING SYSTEM PANEL SANDING PT. 6 W/BAGHOUSE	A	65	3.1	77	42014		92	PM	1.2	4.49	1.2	4.49	1.2	5.256	5.3	89	1775.372	NO
1070015	GEORGIA-PACIFIC CORP. PLYWOOD PLANT	A	17	3273.8	399.6	5	#1,2,3 dryers with a RTO Unit to control VOC.	A							PM	6.85	30	6.85	30	6.85	30.003	30.0	89	1775.372	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	14	#4 PWR BLR /#6 FO <2.35% Sulfur Content, On-spec used oil	A	122	4	395	36000		47	PM	13.4	56			13.4	58.692	58.7	117	2343.782	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	15	#5 PWR BLR #6 FO & ESP;on-spec used oil	A	237	9	445	231500		60	PM	56.8		56.89	218	56.89	249.1782	249.2	117	2343.782	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	16	#4 COMBINATION BOILER; BARK & #6 FO W/ 2.35%S,u-oil.	A	237	7.1	440	216600	101002	91	PM10	114.3	500.6			114.3	500.634	500.6	117	2343.782	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	17	#4 LIME KILN W/ HIGH ENERGY ZURN VENTURI SCRUBBER,u-oil. A	A	131	4.3	165	44800	24200	51	PM	26	113.9	26	113.9	26	113.88	113.9	117	2343.782	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	18	#4 RB (REC'Y BLR) W/ESP & LOW ODOR DESIGN;u-oil. A	A	230	12	400	432000	210000	63.7	PM10	75.6	331.1	75.6	331.1	75.6	331.128	331.1	117	2343.782	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	19	#4 SDTS (SMELT DISSOLVING TANKS); 2 TANKS, EACH W/ A SCRUBBE	A	222	5	155	24150	14515	20	PM	12.68	55.2	12.6	55.2	12.66	55.4508	55.5	117	2343.782	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	37	THERMAL OXIDIZER	A	250	3.6	160	2940		4.8	PM10	7	30.68			7	30.68	30.7	117	2343.782	NO
1070005	GEORGIA-PACIFIC CORP. PULP/PAPER MILL	A	17	3283.4	434	44	NO 7 PACKAGE BOILER REPLACING UNIT 034	A	60	7	750	100400		43.5	PM10	1.9	1.5			1.9	8.322	8.3	117	2343.782	NO
1070030	GEORGIA-PACIFIC CORP. PALATKA CHIPNSAW	A	17	3284.3	436.4	3	KILN FUEL SILO (KF-1) W/ CYCLONE	A	80	2.2	80	2900		12	PM	1.8	5.14			1.8	7.884	7.9	119	2385.149	NO
1070030	GEORGIA-PACIFIC CORP. PALATKA CHIPNSAW	A	17	3284.3	436.4	4	PLANER MILL (PM-1) W/ CYCLONE	A	43	6.7	80	40080	38878	18	PM	3.28	9.36			3.28	14.3664	14.4	119	2385.149	NO
1070030	GEORGIA-PACIFIC CORP. PALATKA CHIPNSAW	A	17	3284.3	436.4	5	TH-1 (TRIM HOG) W/CYCLONE	A	30	2.7	68	15000	14550	43	PM	1.4	4.01	1.4	4.01	1.4	6.132	6.1	119	2385.149	NO
1070030	GEORGIA-PACIFIC CORP. PALATKA CHIPNSAW	A	17	3284.3	436.4	8	CHIP BIN CYCLONE	A	63	1.3	68	8011	8011	100.6	PM10	18.8	32.4			18.8	82.344	82.3	119	2385.149	NO
1230033	GILMAN BUILDING PRODUCTS	A	17	3332.5	250.7	1	Wood Fired Boiler w/ two multi-cyclone collectors in series	A	45	3.17	426	7280		15.4	PM	9.24	40.47	9.24	40.47	9.24	40.4712	40.5	73	1452.432	NO
1230033	GILMAN BUILDING PRODUCTS	A	17	3332.5	250.7	3	BOARD PLANING MILL SHAVINGS COLLECTION SYSTEM - CYCLONE	A	84	6.3	80	43000	41000	22	PM		46.2	10.5	19	10.5	45.99	46.2	73	1452.432	NO
0190005	GILMAN BUILDING PRODUCTS CO	A	17	3336.2	400.9	2	#1 Direct-Fired lumber drying kiln w/ waste wood fuel.	A			200	18400		600	PM10	1.567	6.862			1.567	6.86346	6.9	82	1642.65	NO
0190005	GILMAN BUILDING PRODUCTS CO	A	17	3336.2	400.9	3	#2 Direct-Fired lumber drying kiln w/ waste wood fuel.	A			75				PM10	1.567	6.862			1.567	6.86346	6.9	82	1642.65	NO
1250005	GILMAN BUILDING PRODUCTS CO.	A	17	3319.7	373.5	3	#2 Direct-Fired lumber drying kiln w/ waste wood fuel.	A	25	2.3	200	27250		109	PM	7.6				7.6	33.288	33.3	52	1045.837	NO
0830064	AAA READY MIX	A	17	3236.3	386.3	1	Concrete Batch Plant	A	65	0.8	80	448	433	14	PM	0.48	0.08			0.48	2.1024	2.1	103	2051.986	NO
0830064	AAA READY MIX	A	17	3236.3	386.3	3	FLYASH SILO	A	50	0.5	80	350		29	PM	0.06	0.063			0.06	0.2628	0.3	103	2051.986	NO
1210018	GOLD KIST INC. POULTRY PLANT - LIVE OAK	A	17	3361.4	292.2	3	#3 BOILER, 800 HP, PROCESS STEAM	A	30	2	417	10261	6200	54	PM10	0.24	1.05			0.24	1.0512	1.1	54	1083.68	NO
1210018	GOLD KIST INC. POULTRY PLANT - LIVE OAK	A	17	3361.4	292.2	5	#4 BOILER, 800 HP-SAME AS EU003	A	30	2	417	10261	6200	54	PM10	0.24	1.05			0.24	1.0512	1.1	54	1083.68	NO
1210018	GOLD KIST INC. POULTRY PLANT - LIVE OAK	A	17	3361.4	292.2	7	No.5 Boiler-SAME AS EU003	A	30	2	417	10261	6200	54.4	PM10	0.24	1.05			0.24	1.0512	1.1	54	1083.68	NO
0830043	GOLDEN FLAKE SNACK FOODS	A	17	3228.9	385.9	1	2100# POTATO CHIP FRYER PLANT W/NAT.GAS HEAT EXCH.TO HEAT OI	A	46	2	280	4570	3260	24	PM	9.01	18.74	9.01	18.72	9.01	39.4638	39.5	108	2163.808	NO

Suwannee American Cement (SAC) - Branford, Florida Facility: Florida DEP Point Source Emission Inventory for Potentially Interacting PM_{10} Sources

FACILITY ID	SITE NAME	STATUS	ZONE	NORTH (km)	EAST (km)	EU ID	EU DESCRIPTION	EU STATUS	STACK HT (ft)	DIAM (ft)	EXIT TEMP (F)	ACFM	DSCFM	VEL (ft/s)	POLLUTANT	* POTENTIAL		* ALLOWABLE		* MAXIMUM		* Overall Maximum TPY	Distance Between Sources (KM)	20 * D (KM)	To Be Modeled YES or NO
																(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)				
0830043	GOLDEN FLAKE SNACK FOODS	A	17	3228.9	365.9	2	CORN CHIP TORTILLAFRYER W/NAT.GASFIRED HEAT EXCH.1.9 MMBTU/H	A	42	1.3	280	1470	1049	18	PM	3.36	7	3.36	7	3.36	14.7168	14.7	108	2163.808	NO
0230045	GREAT SOUTHERN TIMBER	C	17	3339.53	348.62	1	Direct-Fired Kiln	A							PM		22.8			0	0	22.8	36	723.7554	NO
0070004	GRIFFIN INDUSTRIES OF FLORIDA	A	17	3310.37	391.02	6	#1 STEAM BOILER #6FO 2.5%S 212GPH NO APC CB 800HP 150P350F A	A	25	2	350	9735		51	PM	5.94	10.19			5.94	26.0172	26.0	70	1397.34	NO
0070004	GRIFFIN INDUSTRIES OF FLORIDA	A	17	3310.37	391.02	7	#2 STEAM BOILER #6FO 2.5%S 212GPH NO APC 800HP 150P350F	A	25	2	350	9735		51	PM	5.94	10.19	5.94	10.19	5.94	26.0172	26.0	70	1397.34	NO
0070004	GRIFFIN INDUSTRIES OF FLORIDA	A	17	3310.37	391.02	8	#3 BOILER: #6 FO W/ 1.5% S	A	38	2.6	355	11943	6851	37	PM	3.802	6.523	3.8	6.52	3.802	16.65276	16.7	70	1397.34	NO
0070004	GRIFFIN INDUSTRIES OF FLORIDA	A	17	3310.37	391.02	10	BAKERY WASTES DRYER, AND CLOSED COUPLED GASIFICATION UNIT	A	34	4	160	40000		53.1	PM10	1.1	2.5			1.1	4.818	4.8	70	1397.34	NO
0070004	GRIFFIN INDUSTRIES OF FLORIDA	A	17	3310.37	391.02	13	BIOMASS BURNER AND ROTARY DRYER	A	34	4	160	40000		53.1	PM10	9.03	39.53			9.03	39.5514	39.6	70	1397.34	NO
0830099	HANSON FKA PIONEER FKA BENDER/BELLEVIEW	A	17	3211.06	394.45	1	CONCRETE TILE PLANT	A	39	1.13	75	900		15	PM	3	3.51			3	13.14	13.1	128	2553.297	NO
7775084	LAKE BUTLER ASPHALT PLANT	A	17	3322.9	368.3	1	Relocatable Asphalt Plant w/ baghouse	A	30	4	125	23600	18500	31.3	PM	34.9	45.4			34.9	152.862	152.9	47	949.7056	NO
1090446	HICKS TRUCKING & LAND CLEARING	A	17	3303.28	462.23	1	Air Curtain Incinerator	C							PM	15	16.38			15	65.7	65.7	141	2828.404	NO
0190007	GREEN COVE SPRINGS	A	17	3304.2	432.4	1	#1 Dryer aka Primary Dryer w/cyclone for product recovery	A	34	2.8	308	28800	15400	78	PM10	33.8	148			33.8	148.044	148.0	112	2232.762	NO
0190007	GREEN COVE SPRINGS	A	17	3304.2	432.4	2	#2 Dryer (Zircon Sand) w/Cylone for product recovery	A	46	1.1	323	3600		63.1	PM10	7.28	31.89			7.28	31.8864	31.9	112	2232.762	NO
0190007	GREEN COVE SPRINGS	A	17	3304.2	432.4	3	ZIRCON CALCINER WITH CYCLONE FOR PRODUCT RECOVERY	A	46	1.1	415	2900		50.9	PM10	6.7	29.35			6.7	29.346	29.4	112	2232.762	NO
0230042	ICS CREMATORY_LAKE CITY FACILITY	C	17	3341.44	336.18	1	HUMAN CREMATORY FIRED W/ LPG.	A							PM	0.33	1.43	0.33	1.43	0.33	1.4454	1.4	30	593.5031	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	6	#5 PWR BLR (BARK/2.5%S FO) 457/348 MMBTU/H; ESP A	A	257	11	415	376000		65.9	PM	171.9	600.5	137.1	600.5	171.9	752.922	752.9	156	3120.223	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	7	#4 RECY BLR W/ESP & B-W LOW ODOR DESIGN A	A	249	12.3	460	420000		58.9	PM	137.5	602.25	137.5	602.25	137.5	602.25	602.3	156	3120.223	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	11	#5 RB-S OR C REC/BOILER-STRAIGHT(S)KRAFT OR CROSS(C)W/ESP P	A	288	9	411	237500	110498	62.2	PM	83.4	356.9	83.3	356.9	83.4	365.292	365.3	156	3120.223	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	13	#4 SMELT DISSOLVING TANK W/VENTURI SCRUBBER	A	6	6	153	28700		16.9	PM	28.5	124.83	28.5	124.83	28.5	124.83	124.8	156	3120.223	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	14	#5 SDT SMELT DISSOLVING TANK W/ WET SCRUBBER P	A	4	4	162	41488		55	PM	15.68	67.17	15.68	67.17	15.68	68.6784	68.7	156	3120.223	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	15	#7 PWR BLR 1021MMBTU COAL FIRED W/ESP FOR PM CONTROL AIA P	A	340	14.8	335	436400		42	PM	102	447.2	102.1	447.2	102.1	447.198	447.2	156	3120.223	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	21	#4 LIME KILN W/ ESP, ALSO BURNS NCG(TRS) GASES.	A	101	3.1	350	72200	40105	159.4	PM10	38.5073	168.2			38.5073	168.662	168.7	156	3120.223	NO
0890003	JSC-FERNANDINA BEACH PAPERBOARD MILL	A	17	3394.2	456.2	34	MILL PACKAGE BOILER	A	100	1.7	250	36000		264.3	PM10	1.3	0.6			1.3	5.694	5.7	156	3120.223	NO
7774808	HIPP CONSTRUCTION NO. 2 ASPHALT PLANT	A	17	3296.5	356.7	2	#2 DRUM MIX ASPHALT PLANT W/VENT SCRBBR	A	21	1.3	170	28400		356	PM	6.55	8.16	6.53	8.16	6.55	28.689	28.7	40	804.6907	NO
7774808	HIPP CONSTRUCTION NO. 2 ASPHALT PLANT	A	17	3296.5	356.7	3	Portable Asphalt Crushing Plant	C			77				PM10	2.18	1.9		-	2.18	9.5484	9.5	40	804.6907	NO
1070038	JOHNSON-OVERTURF FUNERAL HOMES INC	A	17	3276.65	413.52	1	Power-Pak II crematory Incinerator Multiple Chamber Design	A							PM	0.31	1.3	0.31	1.3	0.31	1.3578	1.4	100	2002.096	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	1	FGD Surge Bin (55-ton Bin)	A	50	0.5	68	500	500	42.4	PM	0.09	0.38	0.05	0.23	0.09	0.3942	0.4	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	2	Cage mill dryer system	A	130	5.1	190	66000	45371	53.9	PM	9.72	42.58		48.81	9.72	42.5736	48.6	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	3	Imp Mill Feed Silo A	A	60	0.5	130	500	447	42.4	PM	0.08	0.34	0.05	0.23	0.08	0.3504	0.4	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	4	Imp Mill Flash Calciner System A	A	130	4	325	17560	7358	23.3	PM	1.26	5.52	2.23	9.76	2.23	9.7674	9.8	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	5	Air Cooling System A	A	130	4	150	32000	27698	42.4	PM	9.49	41.5	8.24	36.04	9.49	41.5662	41.6	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	6	Stucco Silo A	A			120				PM	0.08	0.34			0.08	0.3504	0.4	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	7	STARCH SILO	A	52	0.5	68	620	620	52.6	PM	0.16	0.7			0.16	0.7008	0.7	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	9	Norba Grinder and Hammermill System	A	50	1	68	3000	3000	63.7	PM	0.51	2.25	0.51	2.25	0.51	2.2338	2.3	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	13	Wallboard Dryer (4 Natural Gas Burners)	A	46	7.2	165	172180	88711	70.5	PM	0	0.02			0	0	0.0	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	14	Ball Mills	A							PM			0.19	0.83	0.19	0.8322	0.8	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	16	Landplaster Bin	A							PM	4.11	18.02	4.11	18.02	4.11	18.0018	18.0	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	17	Additives System and Pin Mixer	A							PM	2.06	9.01		-	2.06	9.0228	9.0	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	18	IMP Mill Feed Silo B	A							PM			0.05	0.23	0.05	0.219	0.2	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	19	Imp Mill Flash Calciner System B	A	130	3.8	320		13000		PM	1.26	5.52	2.23	9.76	2.23	9.7674	9.8	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	20	Air Cooling System B	A	130	4	155		48000		PM	9.49	41.5	8.23	36.04	9.49	41.5662	41.6	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	21	Stucco Silo B	A			120				PM	0.08	0.34			0.08	0.3504	0.4	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	22	FGD Surge Bin #2	C							PM10	0.05	0.23			0.05	0.219	0.2	119	2388.908	NO
1070039	LAFARGE NORTH AMERICA, INC.	A	17	3290	438	23	Cage Mill Flash Dryer System	C							PM10	11.14	48.81			11.14	48.7932	48.8	119	2388.908	NO
7770245	LIMEROCK INDUSTRIES, INC.	A	17	3284.38	348.9	2	318 Detroit Diesel Power Unit	A							PM10	0.44	1.9			0.44	1.9272	1.9	42	834.5998	NO
7770245	LIMEROCK INDUSTRIES, INC.	A	17	3284.38	348.9	3	671 Detroit Generator	A							PM	0.14	0.6			0.14	0.6132	0.6	42	834.5998	NO
0010007	MADDOX FOUNDRY & MACHINE WORKS,INC.	A	17	3267.3	352.4	1	ELECTRIC ARC FURNACE, WHTNG #8/MT. W/BH	A	25	3.3	120	18000		35	PM	6.28		6.28	6.53	6.28	27.5064	27.5	58	1150.496	NO
0010007	MADDOX FOUNDRY & MACHINE WORKS,INC.	A	17	3267.3	352.4	3	CASTINGS GRINDER OPERATIONS CONTROLLED BY BAGHOUSE	A	34	3.5	77	32000	31360	55	PM	5.3	5.3			5.3	23.214	23.2	58	1150.496	NO
1230046	MARTIN MARIETTA AGGREGATES	A				1	Limestone Quarry and nonmetallic mineral processing plant	A							PM	4.733	11.217			4.733	20.73054	20.7	3331	66625.35	NO
1070041	PALATKA FACILITY	C	17	3305	436.01	1	Human Crematory	C							PM	0.121	0.53	0.327	1.43	0.327	1.43226	1.4	115	2303.042	NO
0830137	MERILLAT/OCALA	A	17	3227.77	385.67	1	Cabinet Manufacturing	A	35	1.75		7000		48.5	PM10		1.2			0	0	1.2	109	2179.27	NO
0830017	LOWELL PROCESSING PLANT	A	17	3245.3	384.5	1	FUGITIVE DUST COLLECTION SYSTEM / BAGHOUSE CONTROL	A	50	4	100	45000		59	PM	6	24.6			6	26.28	26.3	95	1891.805	NO
0830017	LOWELL PROCESSING PLANT	A	17	3245.3	384.5	2	EXISTING 7' DIAM. ROTARY DRYER AND CLAY SILO W/BAGHOUSE	A	45	3.7	220	41000		63	PM10		50.4			0	0	50.4	95	1891.805	NO
0830134	MICKEY BODY COMPANY/OCALA	A	17	3232.48	388.88	1	Washing and Etching	A	32	3.5					PM	0.034	0.15			0.034	0.14892	0.2	107	2143.811	NO
0830134	MICKEY BODY COMPANY/OCALA	A	17	3232.48	388.88	2	Painting and Air Heaters	A	32	3		30000		70.7	PM	0.06	0.27			0.06	0.2628	0.3	107	2143.811	NO
0750001	MID STATE CONCRETE,INC (FKA AAA REDI MIX	A	17	3250.8	362.81	1	READY MIX CONCRETE BATCH PLANT WITH CEMENT SILO	A	60	0.5	70	270		22	PM	12.1		-		12.1	52.998	53.0	77	1540.678	NO
0190068	GREEN COVE SPRINGS	A	17	3316.52	437.68	1	Boat Repair	A							PM		49.9			0	0	49.9	116	2326.474	NO
0010040	MOLTECH POWER SYSTEMS, INC.	A	17	3294.78	361.49	7	Solvent-Based Ni-Metal Hydride Process Lines	A	30	1.5	755	7717	3304	72.8	PM	0.005	0.02	0.01	0.04	0.01	0.0438	0.0	45	905.4152	NO
7775036	MARINELAND RESEARCH RESORT	A				1	200 TPH Eagle crusher, conveyors & screens	A			210				PM	20.2	20.2			20.2	88.476	88.5	3331	66625.35	NO
0010041	GAINESVILLE	A	17	3279.13	369.75	1	#1 BOILER KEELER S/N 4038);NAT GAS;#2 FO .4%S STBY;NO APC	A	105	6	425	34570	24445	20.4	PM	0.37	1.63			0.37	1.6206	1.6	61	1213.478	NO
0010041	GAINESVILLE	A	17	3279.13	369.75	2	#2 BOILER (SN NB-4039);NAT GAS;#2 FO .4%S;NO APC	A	106	6	425	34570	24445	20.4	PM	0.371	1.63			0.371	1.62498	1.6	61	1213.478	NO
0010041	GAINESVILLE	A	17	3279.13	369.75	3	#3 BOILER KELLER S/N 4040) NAT GAS;#2 FO;NO APC	A	106	6	425	34570	24445	20.4	PM	0.371	1.63			0.371	1.62498	1.6	61	1213.478	NO
0010041	GAINESVILLE	A	17	3279.13	369.75	6	BIOWASTE INCINERATOR, BURNS TYPES 0,1,2,3,& 4 WASTES	A	100	6	425	34570	3565	20.4	PM	1.93	4.52	1.93	4.52	1.93	8.4534	8.5	61	1213.478	NO
0230019	LAKE CITY	A	17	3340.04	340.65	5	BIOLOGICAL WASTE INCINERATOR BURNING NATURAL GAS	A	40	2	350	4333	1973	23	PM10	0.59	1.1			0.59	2.5842	2.6	31	820.6674	NO
0890428	NASSAU BD/COM. WEST NASSAU LANDFILL	A	17	3385.74	422.44	2	LANDFILL GAS UTILITY FLARE	A	27	0.83	100		2000		PM		8.92			0	0	8.9	123	2459.157	NO
1250006	NEW RIVER REGIONAL LANDFILL	A	17	3330.3	383.93	1	CLASS I LANDFILL/BIOREACTOR/NON-ASSITED, UTILITY FLARE	A	29	0.83	1400	1730	1600	53.3	PM	1	4.6			1	4.38	4.6	64	1284.895	NO
0830050	NOBILITY HOMES, INC.	A	17	3214.2	398.3	1	(3) SAWS WITH A DUST CONTROL SYSTEM	A	20	3.1	80	5220	5000	11	PM	4	4.2			4	17.52	17.5	127	2547.82	NO
0030001	NORTHEAST FLORIDA STATE HOSPITAL	A	17	3347.8	390.5	1	#1 HTHW BOILER, MOD# LFW-8, SER# M2528, FIRED W/NATURAL GAS	A	50	2.2	550	10272		45	PM10	0.09	0.39			0.09	0.3942	0.4	76	1524.323	NO
0030001	NORTHEAST FLORIDA STATE HOSPITAL	A	17	3347.8	390.5	2	#2 HTHW BOILER, MOD# LFW-8, SER# M2529, FIRED W/ NATURAL GAS	A	50	2.2	550	10272		45	PM10	0.09	0.39			0.09	0.3942	0.4	76	1524.323	NO
0030001	NORTHEAST FLORIDA STATE HOSPITAL	A	17	3347.8	390.5	3	#3 HTHW BOILER, MOD# LFW-8, SER# M3239, FIRED W/ NATURAL GAS	A	50	2.2	550	10272		45	PM10	0.09	0.39			0.09	0.3942	0.4	76	1524.323	NO
0070016	SMI JOIST OF FLORIDA	A	17	3309.75	391.8	2	Fugitive Emissions from GMAW (Welding Operation)	A			77				PM10	0.24	0.73			0.24	1.0512	1.1	71	1413.889	NO
0070016	SMI JOIST OF FLORIDA	A	17	3309.75	391.8		Welding Operations	A			77				PM10	0.24	0.73			0.24	1.0512	1.1	71	1413.889	NO
7775083	PAVE-TEC, INC.	A	17	3296.5	468.3	1	ASPHALT PLANT DRUM MIXER/DRYER W/ BAGHOUSE	A	42	4.68	275	64000	38100	62.5	PM			13.06	7.5	13.06	57.2028	57.2	148	2963.882	NO
0230041	TRUCK/RAIL TRANSFER TERMINAL	A				2	NO. 1 AND NO. 2 BOILERS	A							PM	0.3	1.3	0.3	1.3	0.3	1.314	1.3	3331	66625.35	NO
0010113	PERMA-FIX OF FLORIDA, INC.	A	17	3288	389.5	1	Regenerative Thermal Oxidizer	A							PM		0.042			0	0	0.0	56	1111.137	NO
0790011	PERPETUAL ENERGY CORP OF FLORIDA	A	17	3376.5	270.1	1	BOILER (CARBONACEOUS FUEL) W/MULTICLONE & VENTURI SCRUBBER	A	69	5.8	148	51030		32.2	PM	37	155.4	37	155.4	37	162.06	162.1	80	1590.013	NO
1070043	PALATKA PLANT	C	17	3286.5	436.53	1	Vertical Coating Batch Plant	A							PM	1.37	5.99			1.37	6.0006	6.0	119	2376.452	NO
1070043	PALATKA PLANT	C	17	3286.5	436.53	2	Pouring Batch Plant	A							PM	2.81	12.34			2.81	12.3078	12.3	119	2376.452	NO
1070043	PALATKA PLANT	C	17	3286.5	436.53	3	Spinning Batch Plant	A							PM	3.29	14.39			3.29	14.4102	14.4	119	2376.452	NO

Suwannee American Cement (SAC) - Branford, Florida Facility: Florida DEP Point Source Emission Inventory for Potentially Interacting PM_{10} Sources

FACILITY ID	SITE NAME	STATUS	ZONE	NORTH (km)	EAST (km)	EU ID	EU DESCRIPTION	EU STATUS	STACK HT (ft)	DIAM (ft)	EXIT TEMP (F)	ACFM	DSCFM	VEL (ft/s)	POLLUTANT	* POTENTIAL		* ALLOWABLE		* MAXIMUM		* Overall Maximum TPY	Distance Between Sources (KM)	20 * D (KM)	To Be Modeled YES or NO
																(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)				
1070043	PALATKA PLANT	C	17	3286.5	436.53	4	Horizontal Coating Batch Plant	A							PM	1.6	6.99			1.6	7.008	7.0	119	2376.452	NO
1070043	PALATKA PLANT	C	17	3286.5	436.53	5	Fitting Silo/Mixer consist of 1 cement silo	A							PM	0.011	0.49			0.011	0.04818	0.5	119	2376.452	NO
1070043	PALATKA PLANT	C	17	3286.5	436.53	6	Pipe Coating Operation	A							PM	0.03	0.13			0.03	0.1314	0.1	119	2376.452	NO
0010001	U OF FL COGEN	A	17	3279.29	369.39	7	New LM6000PC-ESPRINT Combustion Turbine	A	93	9.8	257	607360		134.2	PM10	3	13.1			3	13.14	13.1	60	1205.807	NO
1210003	FL POWER SUWANNEE RVR PLANT	A	17	3362.2	290.5	1	Boiler No. 1(Phasell Acid Rain Unit)	A	110	7	318	143667		62	PM	135	246.4	46	251.9	135	591.3	591.3	56	1115.643	NO
1210003	FL POWER SUWANNEE RVR PLANT	A	17	3362.2	290.5	2	Boiler No. 2(Phasell Acid Rain Unit)	A	110	7	340	197000		85	PM	135	246.4	45	246.4	135	591.3	591.3	56	1115.643	NO
1210003	FL POWER SUWANNEE RVR PLANT	A	17	3362.2	290.5	3	Boiler No. 3(Phasell Acid Rain Unit)	A	135	7.7	300	305067		109	PM	135	246.4	88.1	482.3	135	591.3	591.3	56	1115.643	NO
1210003	FL POWER SUWANNEE RVR PLANT	A	17	3362.2	290.5	4	CTEG Peaking Unit No. 1(P-1)	A	22	11.3	726	1255500		208.7	PM	38	28.5			38	166.44	166.4	56	1115.643	NO
1210003	FL POWER SUWANNEE RVR PLANT	A	17	3362.2	290.5	5	CTEG Peaking Unit No. 2(P-2)	A	22	11.3	726	1255500		208.7	PM	38	28.5			38	166.44	166.4	56	1115.643	NO
1210003	FL POWER SUWANNEE RVR PLANT	A	17	3362.2	290.5	6	CTEG Peaking Unit No. 3(P-3)	A	22	11.3	726	1255500		208.7	PM	38	28.5			38	166.44	166.4	56	1115.643	NO
0230008	PURINA MILLS, INC.	A	17	3341.4	341.2	1	1 125 HP HAMMERMILL WITH A BAG FILTER	A	11	1.1	77	2400	2354	42	PM	14.99				14.99	65.6562	65.7	32	648.8645	NO
0230008	PURINA MILLS, INC.	A	17	3341.4	341.2	2	PELLET COOLER W/4 CYCLONES	A	120	1.3	120	25000		313	PM	19.25	9			19.25	84.315	84.3	32	648.8645	NO
0190021	PYRAMID MOULDINGS	A	17	3317.7	434.7	1	NORTH LINE BUFFING W/ CYCLONE CONTROL	A	15	1.2	77	7000		103	PM	0.93		0.76	2.29	0.93	4.0734	4.1	113	2267.162	NO
0190021	PYRAMID MOULDINGS	A	17	3317.7	434.7	4	SOUTH LINE BUFFING SYS W/ A CYCLONE	A	35	1.3	80	7000	7000	87	PM	2.28	6.63			2.28	9.9864	10.0	113	2267.162	NO
0310505	QUINN-SHALZ FUNERAL HOME	C	17	3366.53	457.05	1	HUMAN CREMATORY	C	16	1.67	1136	2077	582	15.8	PM	0.31	1.36			0.31	1.3578	1.4	145	2897.764	NO
0890004	FERNANDINA SULFITE MILL	A	17	3392.2	454.7	1	#1 PWR BOILER, USING #6 FO; COM STK & VENTURI SCRUB W/ #2 PB	A	180	10	136	136700	106000	29	PM	16	70.1	16	70	16	70.08	70.1	154	3074.237	NO
0890004	FERNANDINA SULFITE MILL	A	17	3392.2	454.7	2	#2 PWR BLR COMB BARK & #6 FO; COM STK & VENTURI SCRUBBER W/	A	180	10	136	136700	106000	29	PM	50.6	221.6	50.6	221.6	50.6	221.628	221.6	154	3074.237	NO
0890004	FERNANDINA SULFITE MILL	A	17	3392.2	454.7	3	#3 PWR BLR COMB BRK/#6FO 180/167 MMBTUH VENTURI SCRUBBER A1	A	180	10	136	136700	106000	29	PM	50.6	212.6	50.6	221.6	50.6	221.628	221.6	154	3074.237	NO
0890004	FERNANDINA SULFITE MILL	A	17	3392.2	454.7	6	RECOVERY BLR SULFITE NH3/SSL W/3STG SCRBR & MIST ELIM 0 A	A	264	7.33	126	180096	131400	63.2	PM	67.5	295.6	67.5	295.65	67.5	295.65	295.7	154	3074.237	NO
0790021	REAL WOOD PRODUCTS CORPORATION	C	17	3371.2	268.3	3	GRINDING ROOM (SAWING, GRINDING, PLANNING AND SANDING OPERAT	A	30	1		22660		480.9	PM10	19.865	20.66			19.865	87.0087	87.0	77	1535.196	NO
0190069	KEYSTONE HEIGHTS	A	17	3300.2	405.08	1	Aluminum Fabrication and Sandblasting	A							PM	22.3	24		24	22.3	97.674	97.7	85	1702.066	NO
0290015	RICK GOODING FUNERAL HOME	C	17	3279.09	297.69	1	Human Crematory	C	17	1.7	1000	2200	657	16.2	PM	0.45	2			0.45	1.971	2.0	44	872.4163	NO
0830027	RINKER/OCALA	A	17	3227.3	388.7	1	CONCRETE BATCH PLANT W/DUSTY DUSTLESS BAGHOUSE	A	30	1	80	50		1	PM10		1.13			0	0	1.1	111	2223.048	NO
0830027	RINKER/OCALA	A	17	3227.3	388.7	2	CONCRETE BATCHING SILO "A" W/DUSTY DUSTLESS BAGHOUSE	A	62	15.9	80	505			PM10		1.1			0	0	1.1	111	2223.048	NO
0830027	RINKER/OCALA	A	17	3227.3	388.7	4	CEMENT WEIGH HOPPER W/BAGHOUSE CONTROL	A	50		80	505		20	PM	0.06	0.06			0.06	0.2628	0.3	111	2223.048	NO
0830030	ROBERTS FUNERAL HOME OF DUNNELLON, INC.	A	17	3214.18	360.14	1	HUMAN CREMATORY	A							PM	0.23	0.35	0.023	0.35	0.23	1.0074	1.0	109	2174.081	NO
0830010	ROYAL OAK ENTERPRISES	A	17	3231.1	387.5	1	NICHOLS HERRESHOFF RETORT CARBONIZER	A	40	4	1600	2222		2	PM10		51.65			0	0	51.7	107	2148.212	NO
0830010	ROYAL OAK ENTERPRISES	A	17	3231.1	387.5	4	BRIQUETE PRESS ROOM & DRYER	A	10	3	90	8000		14	PM		37			0	0	37.0	107	2148.212	NO
0830010	ROYAL OAK ENTERPRISES	A	17	3231.1	387.5	5	3 HOPPERS, 1 HAMMER MILL, 4 STORAGE SILOS	A	22	4	80	3800		5	PM		0.35			0	0	0.4	107	2148.212	NO
0830010	ROYAL OAK ENTERPRISES	A	17	3231.1	387.5	6	CHAR MILL AND CHAR HOUSE	A	10	1.5	80	8300		78	PM	1.42	6.23			1.42	6.2196	6.2	107	2148.212	NO
0830010	ROYAL OAK ENTERPRISES	A	17	3231.1	387.5	7	BRIQUETTE TANK, ELEATOR, SCREEN, 2 BAGGING MACHINES	A	10	1.5	80	8300		78	PM	1.42	6.23			1.42	6.2196	6.2	107	2148.212	NO
0830010	ROYAL OAK ENTERPRISES	A	17	3231.1	387.5	8	Bagging Machine	A			80				PM	0.1	0.42			0.1	0.438	0.4	107	2148.212	NO
0030008	SANDERSON PIPE CORPORATION	A	17	3347.71	379.61	1	9 SILOS WITH ITS OWN BIN VENT FILTER TO CONTROL PM EMISSIONS	A	0	0	77				PM	0.926	4.055			0.926	4.05588	4.1	66	1329.035	NO
0830051	SEILERS CONCRETE	A	17	3229.7	409.6	1	CEMENT SILO AT CONCRETE BATCH PLANT	A	11	1					PM	0.04	0.05			0.04	0.1752	0.2	123	2464.776	NO
1070025	SEMINOLE POWER PLANT	A	17	3289.2	438.8	1	Steam Electric Generator No. 1	A	675	36	128	1600000		26	PM	215.2	924.4	215.2	942.4	215.2	942.576	942.6	120	2408.01	NO
1070025	SEMINOLE POWER PLANT	A	17	3289.2	438.8	2	Steam Electric Generator No. 2	A	675	36	128	1600000		26	PM	215.2	924.4	215.2	942.4	215.2	942.576	942.6	120	2408.01	NO
0830100	SKYLINE/OAK SPRINGS # 531	A	17	3227.37	388.91	2	Cyclone	A			70				PM	4.32	18.9			4.32	18.9216	18.9	111	2224.482	NO
1070029	WATTS FUNERAL HOME	A	17	3273	441.7	1	HUMAN CREMATORY B&L SYSTEMS #N-20AA	A	10	1.5	550	1400	660	13	PM			0.22	0.35	0.22	0.9636	1.0	128	2554.047	NO
1070029	WATTS FUNERAL HOME	A	17	3273	441.7	2	HUMAN CREMATORY, B&L SYSTEMS, MODEL N20	A	10	1.5	550	1400	660	13	PM			0.22	0.35	0.22	0.9636	1.0	128	2554.047	NO
0010064	SOUTHERN PRE-CAST, INC.	A	17	3295.7	359	2	#2 Pre-Cast Concrete Batch Plant	A							PM10	3.44	15.1			3.44	15.0672	15.1	43	852.7804	NO
0010064	SOUTHERN PRE-CAST, INC.	A	17	3295.7	359	4	Sandblasting Operation	A							PM		24.9			0	0	24.9	43	852.7804	NO
1090444	ST. AUGUSTINE MEMORIAL PARK & CREMATORY	A	17	3302.03	468.45	1	human crematory	A	15	1.5	550	2100	700	19.8	PM10	0.121	0.19	0.48	0.75	0.48	2.1024	2.1	148	2954.554	NO
0830045	STANDARD SAND & SILICA CO	A	17	3231.3	412.7	1	35 TPH WET SAND DRYER WITH 85% EFF.CYCLONE,#5 FUEL OIL FIRED	A	35	1.2	205	7705		113	PM10		7.33			0	0	7.3	124	2487.712	NO
0830059	STEVEN COUNTS, INC. PLANT #1	A	17	3237.5	385.2	1	ASPHALT BATCH PLANT	A	30	4	300	44000	34455	58	PM	0.41	0.44	5.82	6.05	5.82	25.4916	25.5	101	2019.481	NO
0830004	ROBERTS FUNERAL HOME	A	17	3228.2	389.2	3	IE&E Power Pak II Human Cremator (replaces IE43-M94, EU 001)	A	17	1.7	1000	2200	657	16.2	PM	0.45	2			0.45	1.971	2.0	111	2214.866	NO
0290004	SUWANNEE LUMBER COMPANY	A	17	3279.74	292.43	2	Lumber Dry Kiln #1	A	26	2	240	43000		228	PM10	2	8.4			2	8.76	8.8	46	923.5235	NO
0790022	BEGGS FUNERAL HOME MADISON CHAPEL	C	17	3373.21	270.27	1	Dual chamber gas-fired cremation unit for human remains	C	17	1.7	1000	2000		14.7	PM	0.45	2			0.45	1.971	2.0	77	1538.04	NO
0190019	TAMKO ROOFING PRODUCTS, INC.	A	17	3318.8	435.2	1	#1 ASPHALT ROOFING LINE W/CVM POLLUTION CONTROL UNIT	A	11	2.2	104	18900		82	PM			12	52.56	12	52.56	52.6	114	2276.92	NO
0830039	THE BREWER COMPANY	A	17	3230.8	390.8	1	EIGHT MIXERS AND THREE PETROLEUM STORAGE TANKS	A	24	1.7	80	7000	6700	51	PM	0.9	0.52	20.41	38.2	20.41	89.3958	89.4	110	2194.113	NO
0830039	THE BREWER COMPANY	A	17	3230.8	390.8	2	Mineral storage silo	A	50	1.3	80	300		3.8	PM	25				25	109.5	109.5	110	2194.113	NO
0830058	TOWN-I-FLEX HOSE MANUFACTURING	A	17	3216.3	404.7	1	SANDBLASTING BOOTH	A	10	1	380	680	430	14	PM	1.71	1.88			1.71	7.4898	7.5	130	2594.783	NO
0830060	TOWNLEY FOUNDRY & MACHINE COMPANY, INC	A	17	3216.3	404.7	2	SANDBLASTING BOOTH	A	3	3	70	7300	7000	17	PM	1.71	7.5			1.71	7.4898	7.5	130	2594.783	NO
0830060	TOWNLEY FOUNDRY & MACHINE COMPANY, INC	A	17	3216.3	404.7	3	MELTING, MOLDING, & GRINDING OPERATION (INCLUDES 4 FURNACES)	A	24	3	80	75710	74310	178	PM	0.37	1.63			0.37	1.6206	1.6	130	2594.783	NO
0830062	TRU BALANCE WHEEL WEIGHTS, INC.	A	17	3230.7	414.2	1	5 POT FURNACES & 4 CASTING MOLDS	A	12	1.4	90	1800		19	PM	0.002	0.002			0.002	0.00876	0.0	126	2517.914	NO
0190056	UNIFIX USA - NATIONAL GYPSUM CO. - CLAY	A				4	WET END PROCESS DUST COLLECTOR	A	25						PM		5			0	0	5.0	3331	66625.35	NO
0190056	UNIFIX USA - NATIONAL GYPSUM CO. - CLAY	A				5	DRY END PROCESS DUST COLLECTOR	A	20						PM		3			0	0	3.0	3331	66625.35	NO
0010062	UNIV. OF FLORIDA - ANML RESRCE/HUMAN CRE	A	17	3279.37	369.93	3	INCINERATOR (ANIMAL RESOURCES) TO BURN ANIMAL BEDDING/REMAIN	A	136	1.6	418	8179	5152	67	PM			0.76	0.79	0.76	3.3288	3.3	61	1213.468	NO
0010121	ANIMAL CARE SERVICES	C	17	3278.42	370.02	1	Animal Creamatory	C							PM	1.11	4.86			1.11	4.8618	4.9	61	1226.377	NO
0010037	V. E. WHITEHURST & SONS, INC.	A	17	3289	368.7	1	#2 ASPHALT PLNT W/BARBER GREEN MOD CF08 BAG FILTER	A	32	4	292	30700		40	PM	21.43		21.43	22.29	21.43	93.6634	93.9	54	1087.33	NO
0010037	V. E. WHITEHURST & SONS, INC.	A	17	3289	368.7	2	#3 DRUM MIX ASPHALT PLANT W/ BAGHOUSE	A	33	3.7	300	47000		72	PM	8.4		8.4	8.84	8.4	36.792	36.8	54	1087.33	NO
0010037	V. E. WHITEHURST & SONS, INC.	A	17	3289	368.7	3	#4 Asphalt Plant w/ Baghouse	C	31	3.83	300	68145	35507	98.6	PM	12.17	53.3	12.17	53.3	12.17	53.3046	53.3	54	1087.33	NO
0010037	V. E. WHITEHURST & SONS, INC.	A	17	3289	368.7	4	RAP Crusher	C			77				PM10	2.18	1.42			2.18	9.5484	9.5	54	1087.33	NO
1090037	V.J.USINA CONTRACTING, INC.	A	17	3302.25	466.74	1	AIR CURTAIN INCINERATOR, MCPHERSON M30F PIT & M18ACD BLOWER	A			1700	25000	5549		PM	0.02	41.8			0.02	0.0876	41.8	146	2920.094	NO
0190031	VAC-CON	A	17	3316.1	435	1	SPRAY PAINT FAC W/ PAINT ARRESTOR FILTER BANKS & A BAGHOUSE	A	24	4	78	30000		39	PM			0.0092	0.014	0.0092	0.040296	0.0	114	2272.832	NO
0190059	W.W CARTER CONTRACTMASTERS ROAD PROPERTY	A	17	3324.69	414.37	1	M30F AIR CURTAIN DESTRUCTOR	A		1.5	850	61215		577.3	PM	20	4.8			20	87.6	87.6	93	1868.83	NO
1230030	CABBAGE GROVE ASPHALT PLANT	A	17	3340.7	218.3	1	ASPHALT BATCH PLANT W/ BAGHOUSE	A	22	3.7	350	48000		74	PM	37.72	47.15	39.7	57.4	39.7	173.886	173.9	106	2120.812	NO
7770066	CLIFTON MINE	A	17	3233.88	386.8	1	DRUM MIX ASPHALT PLANT	A	23	4.1	280	65170		82.3	PM10	12.8	12.8			12.8	56.064	56.1	105	2095.911	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	1	#2 PHOS ROCK GRNDER CHEM CMPLX 100 TO 200 MESH W/3.9%F IN RO	A	130	1.1	146	5533		97	PM	22.98	196.5	22.03	96.5	22.98	100.6524	196.5	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	2	A PHOS ACID PLANT WPPA DORR-OLIVER W CYC SCRUBBER	A	100	3.5	100	21000		36	PM	36.16	160.3	36.54	160.03	36.54	160.0452	160.3	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	3	A POLLYPHOS PLANT GAS-FIRED CALCINER ANIMAL FEED	A	100	4	120	25000		33	PM	14.05	59	14.05	59	14.05	61.539	61.5	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	4	X-TRAIN(DICAL)2 OPN MDS:D-18.5,D-21; CNTS-SCBRS&BGCLR	A	120	7	120	92400		40	PM	45	201.96	46.11	201.96	46.11	201.9618	202.0	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	6	SRM SILOS MINERALS STORAGE W/WET SCRUBBER SIC 1475	A	110	3.5	110	25000		43	PM	48.17	210.98	48.17	210.98	48.17	210.9846	211.0	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	8	#1 DAP PLNT "Y"(5 MODES) SCRUBBER,NG,#4FO 1.5%S 34MMBTUH	A	120	7	120	92400		40	PM	33.33	145.99	33.33	145.99	33.33	145.9854	146.0	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	9	SRM EAST DRYER MINERAL ROCK; NGAS/4 FO; W/ WET SCRUB (OLD #2	A	60	7	160	82197		35	PM	43.11	188.65	43.11	188.85	43.11	188.8218	188.9	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	10	#1 MAP/DAP/GTSP STRGE BLDG W/ BUFLO SCRUBR FL/GTSP PM/ALL 3	A	100	6.5	90	99000		49	PM	36.17	158.42	36.17	158.42	36.17	158.4246	158.4	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	13	SRM ROCK GRINDER W/BAGHOUSE SIC 1475	A	60	1.4	120	3000		32	PM	30.43	99.69	30.43	99.69	30.43	133.2834	133.3	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	15	MAP/DAP SCREEN/SHIP W/CYCLONE& VENTURI SCRUBBER	A	120	2.3	90	20000		80	PM	40.41	177	40.41	177	40.41	176.9958	177.0	54	1074.963	NO

Suwannee American Cement (SAC) - Branford, Florida Facility: Florida DEP Point Source Emission Inventory for Potentially Interacting PM_{10} Sources

FACILITY ID	SITE NAME	STATUS	ZONE	NORTH (km)	EAST (km)	EU ID	EU DESCRIPTION	EU STATUS	STACK HT (ft)	DIAM (ft)	EXIT TEMP (F)	ACFM	DSCFM	VEL (ft/s)	POLLUTANT	[a] POTENTIAL		[a] ALLOWABLE		[b] MAXIMUM		[c] Overall Maximum TPY	Distance Between Sources (KM)	20 * D (KM)	To Be Modeled YES or NO
																(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)				
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	16	#1 PHOS ROCK GRINDER W/BAG COLLECTOR	A	120	3.5	150	18000		31	PM	36.72	160.83	36.72	160.83	36.72	160.8336	160.8	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	17	SRM WEST DRYER MINERAL ROCK NG #4FO STBY (OLD #1)	A	60	7	160	82197		35	PM	43.11	188.85	43.11	188.85	43.11	188.8218	188.9	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	19	C PHOS ACID PLNT (HEMI-HYDRATE) SCRBR(F4)	A	108	4	100	40000		53	PM	5	21.8	5	21.8	5	21.9	21.9	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	20	B PHOS ACID PLNT PRAYON SCRBR(F4)	A	106	4	100	40000		53	PM	5	21.9	5	21.9	5	21.9	21.9	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	32	#2 DAP (Z) W/ VENTURI & CYC SCRUBR;DAP,MAP VIA 30&50/40 P	A	140	8	120	96000		31	PM	47.37	206.9	47.37	206.9	47.37	207.4806	207.5	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	38	B POLLYPHOS PLANT GAS CALCINER ANIMAL FEED SUPPL	A	100	4	120	25000		33	PM	14.05	59	14.05	59	14.05	61.539	61.5	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	39	C AUX BLR,NAT GAS,#6FO 1.0%S,155MMBTUPH,USED OIL 1%S. A1A P	A	104	6.5	380	50000		25	PM	13.8	60.5	13.8	60.5	13.8	60.444	60.5	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	40	D AUX BOILER,USING GAS OR(#6FO OR USED OIL 1%S). A	A	104	6.5	380	50000		25	PM	13.8	60.5	13.8	60.5	13.8	60.444	60.5	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	41	DICAL ACID PREP W/ PACKED SCRUBBER (EP1);EP2 silo baghouse.	A	75	2	115	8700		46	PM	1.12	4.7	1.12	4.7	1.12	4.9056	4.9	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	42	POLLYPHOS FEED PREP W/EPs-11,10,9,L1,L2,SA1,SA2.	A	94	3.5	156	28000		48	PM	31.98	134.35	31.99	134.35	31.99	140.1162	140.1	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	44	A&B COOLERS (POLLYPHOS)COMMON STACK (EP12)	A	50	4	550	50000		66	PM	25.04	105.17	25.04	105.17	25.04	109.6752	109.7	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	54	MOLTEN SULFUR SYSTEM FOR "C"&"D" H2SO4 PLNTS	A	2	0.67	200	18	14	0.9	PM	0.66	2.18			0.66	2.8908	2.9	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	62	POLLYPHOS SILOS W/EP14 & EP16.	A	25	1.2	75	5000	5100	73	PM	0.857	3.75			0.857	3.75366	3.8	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	64	SCM Rock Dryer	A	50	7	110	130000		56.3	PM	46.4	203.23	46.4	203.23	46.4	203.232	203.2	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	65	SCM SILOS	A	110	4	110	25000		33.2	PM	46.4	203.23	46.4	203.23	46.4	203.232	203.2	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	68	"E" AUXILIARY BOILER	A	50	5.3	380	67000		50.8	PM	13.9	59.2	13.9	59.2	13.9	60.882	60.9	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	69	D PHOSPHORIC ACID PLANT	A	105	3	90	35000		82.5	PM	42.52	185.73	42.52	185.73	42.52	186.2376	186.2	54	1074.963	NO
0470002	WHITE SPRS AG CHEM-SR/SC CMPLX	A	17	3368.78	330	72	MOLTEN SULFUR SYSTEM;vents-RP,FP,S1,S2.	A	25	0.6	200	36	28	2.1	PM	1.43	3.48			1.43	6.2634	6.3	54	1074.963	NO

Footnotes:

[a] Based on FDEP Emission Inventory Data.

[b] The MAXIMUM hourly emission rate (lb/hr) was based the greater of either the POTENTIAL or ALLOWABLE hourly emission rate provided by FDEP.
The MAXIMUM annual emission rate (TPY) was based on the MAXIMUM hourly emission rate (lb/hr) multiplied by 8,760 hours per year.

[c] The "Overall Maximum TPY" used for the 20D Analysis was the maximum value from the POTENTIAL, ALLOWABLE or MAXIMUM TPY values.

[d] Because this Facility (Florida Rock Industries, Inc.) is PSD, all Florida Rock sources were included in the PSD and NAAQS Class II Modeling.
Refer to the next table for a complete list of Florida Rock sources included in the PSD and NAAQS Analyses.

FLORIDA ROCK

Florida Rock Industries, Inc.: PSD Emission Inventory for PM_{10} Sources [a]

Source ID	Description	Easting, m	Northing, m	Stack Height, ft	Temperature, F	Exit Velocity, m/s	Stack Diameter, ft	PM10 Emissions, lb/hr
FR1_E28	Recycle dust + raw meal to homogenization silo	346,357.7	3,285,762.0	40.0	350	20.1	2.2	0.70
FR1_G07	Recycle dust + raw meal into homogenization silo	346,385.9	3,285,746.8	225.1	200	21.4	2.2	0.91
FR1_H08	Raw meal + recycle dust to preheater	346,401.0	3,285,769.7	60.0	200	20.4	1.4	0.34
FR1_E21	kiln	346,417.1	3,285,766.4	250.0	215	16.4	9.4	22.10
FR1_K15	cooler	346,504.4	3,285,786.8	196.9	480	12.8	9.0	7.70
FR1_L03	Clinker cooler discharge and breaker	346,480.2	3,285,769.3	10.2	300	20.0	1.0	0.15
FR1_L06	Clinker into clinker silos	346,546.2	3,285,781.3	190.0	300	20.8	1.1	0.20
FR1_L08	Clinker into clinker silos	346,546.2	3,285,781.3	190.0	300	20.8	1.1	0.20
FR1_M08	Clinker to finish mill	346,554.3	3,285,707.9	10.2	212	20.8	1.1	0.22
FR1_N09	Finish mill air separator	346,567.9	3,285,692.6	133.9	210	13.9	7.5	5.56
FR1_N12	Finish mill	346,567.5	3,285,697.4	133.9	210	20.4	3.1	1.39
FR1_N91	Cement handling in finish mill	346,558.2	3,285,692.9	123.0	200	20.4	1.4	0.34
FR1_Q25	Cement storage silos	346,618.7	3,285,848.4	260.2	150	20.0	2.0	0.74
FR1_Q26	Cement storage silos	346,632.9	3,285,850.9	260.2	150	20.0	2.0	0.74
FR1_Q14	Cement silo loadout	346,619.9	3,285,840.5	30.2	150	20.0	1.0	0.19
FR1_Q17	Cement silo loadout	346,634.3	3,285,843.0	30.2	150	20.0	1.0	0.19
FR1_Q21	Cement silo loadout	346,631.5	3,285,859.0	30.2	150	20.0	1.0	0.19
FR1_R12	Cement bagging operation	346,639.6	3,285,812.8	100.1	150	20.0	2.0	0.74
FR1_S17	Coal mill	346,466.9	3,285,784.7	164.1	150	20.3	2.4	1.25
FR1_S21	Pulverized coal storage bin	346,461.3	3,285,781.5	346.5	150	20.0	1.00	0.22
FR2_B03	Primary crushing	346,377	3,285,477	Modeled as a Volume Source				0.15
FR2_D33	Transfer D32-34 belts	346,357	3,285,635	18.1	77	11.3	1.31	0.20
FR2_D35	Transfer D34-D36 belts	346,280	3,285,735	168.5	77	11.3	1.31	0.20
FR2_D37	Transfer D36-39 belts and bins	346,276	3,285,738	159.8	77	12.7	1.60	0.33
FR2_D49	D Bins unloading to belts	346,289	3,285,739	83.5	77	12.7	1.60	0.33
FR2_2D37	Transfer D36-2D39 belts and bins	346,278	3,285,727	159.8	77	12.7	1.60	0.33
FR2_2D49	2D Bins unloading to belts	346,291	3,285,730	83.5	77	12.7	1.60	0.33
FR2_2E21	Inline kiln/raw mill w/air heater	346,430	3,285,693	314.7	356	16.0	9.42	25.00
FR2_2E28	Airslides and bottom of airlift	346,395	3,285,686	42.5	300	11.3	1.31	0.14
FR2_2E34	Bin 2E30	346,403	3,285,693	100.0	300	7.5	1.31	0.09
FR2_2G07	Top of airlift and homogenizing silo	346,412	3,285,694	240.6	200	14.3	2.61	0.81
FR2_2H08	Homogenizing silo to preheater feed	346,515	3,285,729	50.5	200	7.5	1.31	0.11
FR2_2K15	Clinker cooler + coal mill gases after ESP	346,490	3,285,716	197.8	480	13.7	9.00	8.75
FR2_2L03	Cooler discharge	346,388	3,285,697	38.0	300	8.6	1.50	0.14
FR2_2L13	Clinker transport (2L20, 2L08)	346,538	3,285,777	190.0	300	9.1	1.46	0.14
FR2_2L15	Clinker transport (2L20, 2L01, 2L08, 2L09)	346,546	3,285,756	189.5	300	20.9	1.36	0.28
FR2_2L16	Clinker transport (2L01, 2L20)	346,554	3,285,726	189.5	300	13.9	1.36	0.19
FR2_2L18	Clinker into quadrated silo	346,522	3,285,753	189.5	212	13.9	1.36	0.21
FR2_2M07	Clinker from quadrated silo	346,526	3,285,730	16.5	212	13.9	1.36	0.21
FR2_2M08	Clinker/additives to Mill #2	346,526	3,285,717	44.0	212	13.9	1.36	0.21
FR2_2N93	Finish mill #2 air separator	346,528	3,285,669	130.7	158	14.7	7.50	6.43
FR2_2N94	Finish mill #2	346,538	3,285,691	130.7	203	14.2	4.00	1.64
FR2_2N91	Airlift to separator	346,539	3,285,669	44.5	200	18.3	1.46	0.32
FR2_2N36	Cement to fringe silo	346,544	3,285,659	63.8	130	15.7	1.29	0.24
FR2_2Q25	Cement to silo #6	346,657	3,285,776	191.6	150	11.4	2.61	0.70
FR2_2Q26	Cement to silo #7	346,672	3,285,779	191.6	150	11.4	2.61	0.70
FR2_2Q14	Loadout from silos 6/7	346,661	3,285,771	29.8	150	8.6	1.50	0.17
FR2_2S17	Coal mill #2	346,484	3,285,727	197.8	150	1.9	9.00	1.67
FR2_2S21	Pulverized coal bin	346,515	3,285,729	68.0	150	7.5	1.31	0.15

[a] Derived from Koogler & Associates November 8, 2004 PSD analysis for Florida Rock Industries, Inc.

APPENDIX B

SAC GEP ANALYSIS FOR PSD AND NAAQS

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BEE-Line Software Version: 9.30

Input File - SAC_PSDPM10.GPW

Input File - SAC_PSDPM10.PIP

Output File - SAC_PSDPM10.TAB

**** Output File - SAC_PSDPM10.SUM ****

Output File - SAC_PSDPM10.SO

BPIP (Dated: 04112)

DATE : 2/ 9/2005
TIME : 16:16:39

C:\050430.0001\SAC_PSDPM10.bst BEESTWin GEP Files 2/9/2005 4:16:39 PM

============================
BPIP PROCESSING INFORMATION:
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The ST flag has been set for preparing downwash data for an ISCST run.

Inputs entered in METERS will be converted to meters using a conversion factor of 1.0000. Output will be in meters.

The UTMP variable is set to UTMY. The input is assumed to be in UTM coordinates. BPIP will move the UTM origin to the first pair of UTM coordinates read. The UTM coordinates of the new origin will be subtracted from all the other UTM coordinates entered to form this new local coordinate system.

Plant north is set to 0.00 degrees with respect to True North.

C:\050430.0001\SAC_PSDPM10.bst BEESTWin GEP Files 2/9/2005 4:16:39 PM

PRELIMINARY* GEP STACK HEIGHT RESULTS TABLE
(Output Units: meters)

Stack Name	Stack Height	Stack-Building Base Elevation Differences	GEP** EQN1	Preliminary* GEP Stack Height Value
E21_01	96.01	0.00	144.26	144.26
E28_01	17.07	0.10	152.43	152.43
G07_01	73.76	0.00	152.53	152.53
H08_01	15.24	-0.10	152.63	152.63
L03_01	11.28	-0.10	142.47	142.47
L06_01	58.52	-0.10	142.34	142.34
M08_01	5.79	-0.20	142.44	142.44

S21_01	18.29	-0.10	144.12	144.12
K15_01	65.23	-0.10	142.34	142.34
E34_01	15.24	-0.10	152.63	152.63
H08A_01	10.67	-0.20	152.73	152.73
U05_01	36.58	0.20	144.06	144.06
N09_01	53.34	-0.20	142.44	142.44
N12_01	39.93	-0.20	142.44	142.44
N36_01	19.81	-0.20	142.44	142.44
N91_01	14.33	-0.20	142.44	142.44
P03_01	16.46	-0.20	142.44	142.44
P11_01	59.44	-0.20	142.44	142.44
Q14_01	8.84	-0.20	142.44	142.44
Q17_01	11.89	-0.20	142.44	142.44
Q24_01	17.37	-0.20	142.44	142.44
S17_01	30.48	0.00	143.66	143.66
E28_02	17.07	0.00	152.53	152.53
E34_02	15.24	-0.20	152.73	152.73
G07_02	73.76	-0.10	152.63	152.63
H08_02	15.24	-0.20	152.73	152.73
H08A_02	10.67	-0.20	152.73	152.73
U05_02	36.58	0.20	144.06	144.06
E21_02	96.01	0.10	151.81	151.81
L03_02	11.28	-0.20	151.90	151.90
L06_02	58.52	0.10	146.79	146.79
L25_02	24.99	-0.10	143.28	143.28
M08_02	5.79	0.00	145.68	145.68
M09_02	3.05	-0.10	143.42	143.42
N09_02	53.34	-0.20	142.44	142.44
N12_02	53.34	-0.20	142.44	142.44
N36_02	19.81	-0.20	142.44	142.44
N91_02	14.33	-0.20	142.44	142.44
P03_02	16.46	-0.20	142.44	142.44
P11_02	59.44	-0.20	142.44	142.44
Q17_02	11.89	-0.20	142.44	142.44
S17_02	30.48	0.00	144.26	144.26
S21_02	18.29	0.00	144.26	144.26

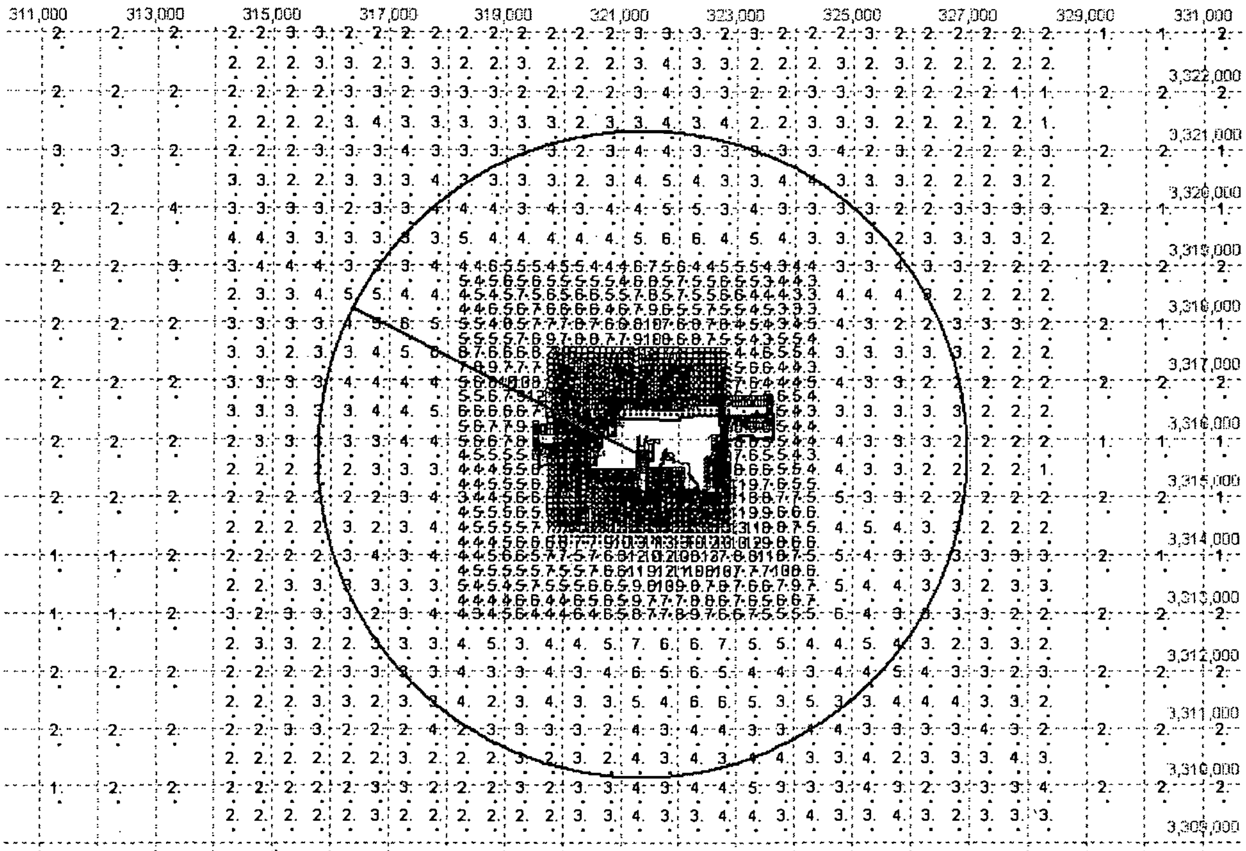
* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.

** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

Note: Criteria for determining stack heights for modeling emission limitations for a source can be found in Table 3.1 of the GEP Technical Support Document.

APPENDIX C

SIGNIFICANT IMPACT AREA FOR PM_{10}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BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS IN SUPPORT OF PSD PERMIT APPLICATION SUWANNEE AMERICAN CEMENT COMPANY, INC. BRANFORD, FLORIDA

by

Environmental Quality Management, Inc.
Cedar Terrace Office Park, Suite 250
3325 Durham-Chapel Hill Boulevard
Durham, North Carolina 27707

PN 050430.0001.0004

February 16, 2005

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CONTENTS (continued)

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TABLES

SECTION 1

INTRODUCTION

The Suwannee American Cement Company, Inc. (SAC) plans to construct a new dry process preheater/precalciner Portland cement kiln system and associated equipment to be located at its existing cement plant near Branford, Florida. The existing plant is subject to a prevention of significant deterioration (PSD) permit originally issued by the Florida Department of Environmental Protection (DEP) on June 1, 2000. The new kiln system will result in increased throughput for the existing primary crusher, raw material, and coal handling and conveying systems and thus, certain existing throughput limits will need to be increased. The increased emissions of particulate matter (PM), PM less than 10 microns in diameter (PM_{10}), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen oxide (NO_x), and volatile organic compound (VOC) will exceed the significant emission rates specified at FAC 62-212, Table 212.400-2. Because the Branford area remains in attainment with the National Ambient Air Quality Standards (NAAQS) for the above pollutants, the plant modification is subject to the Best Available Control Technology (BACT) requirements under Florida's PSD rules at FAC 62-212.400 for each of these pollutants.

The new kiln system and associated equipment will be very similar in size and design to the existing systems, except that the clinker cooler gas will be vented through the raw mill and the main baghouse and stack, thus eliminating a major source of particulate matter at the plant. The new kiln system will have a capacity of 215 tons/h of material fed to the preheater (dry basis) and 126.8 tons/h of clinker production. The new finish mill will have a capacity of 175 tons/h of Portland cement production. Annual production will be 1,789,230 tons per year of material fed to the preheater (dry basis) and 1,055,467 tons per year of clinker. The new finish mill will result in an increase of 1,191,360 tons per year of Portland cement production. The raw materials and additives used in the new kiln system will be the same as are used or will be used in the existing kiln system, including the mercury content that complies with the current throughput limit. The raw materials include limestone (or other calcium carbonate sources), fly ash (or other alumina sources), sand (or other silica sources), and iron (or other iron sources). Up to 45 tons/h of 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 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 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 150,000 tons of coal and petroleum coke annually. The new equipment will include additional raw material storage bins, clinker storage silos, cement storage silos, and associated conveyor systems.

Emissions units addressed by this permitting action are:

EU ID	Description
001	Primary crusher and assoc. belt conveyors
003	Raw material processing – conveyor transfer points
009	Coal conveying equipment
New	Clinker and cement processing operations controlled by baghouses
New	New coal mill system controlled by baghouse
New	New in line kiln/raw mill/cooler controlled by baghouse – main stack
New	New raw material processing controlled by baghouses
New	Storage piles, 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, FAC, 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})

The various physical and chemical processes at a cement plant generate particulate matter (PM/PM_{10}) 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). Fabric filters and ESP's 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.

ESP's 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 be sent to the roller mill for drying of the raw materials and will exhaust through the main stack, thus eliminating the clinker cooler emission point. This will help to reduce PM and PM_{10} emissions from the plant.

A review of cement plant permits issued since the June 2000 initial SAC permit did not reveal PM/PM_{10} emission limits more stringent than the limits contained in that permit. 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). SAC proposes the same emission limits for the kiln/cooler system, other baghouses, and fugitive emission sources as in the existing PSD permit. These limits are summarized in Section 6.

SECTION 3

BACT ANALYSIS FOR SO_2

3.1 Description of Pyroprocessing System

SAC 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 SAC 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 stage of the preheater 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 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

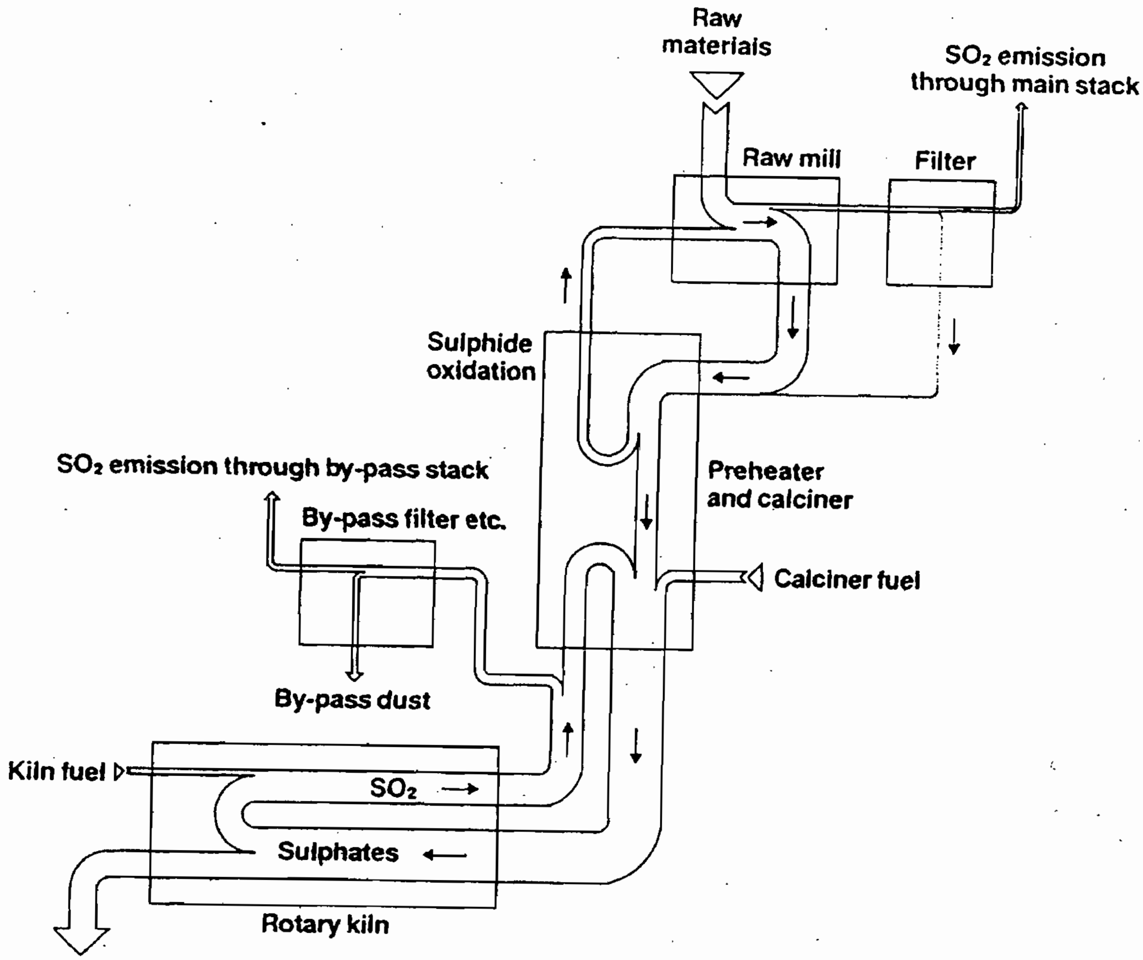

Figure 1. Sulfur Circulation in Preheater/Precalciner Kiln System

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.

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 SAC 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 SAC, 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 Application of Wet Scrubbing

At the present time there have been only a small number of cement kilns that have employed wet scrubbing technology for abatement of SO_2 in North America. There are, however, several kilns, which have permits to install wet scrubbers. 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 State 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 kiln run time.

TXI, Midlothian, Texas – A scrubber was installed as part of an upgrade of the plant from wet kiln operation (4 unit) to a new 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.

There are two other wet scrubbers that have been permitted at cement plants in the US as part of current expansion projects. These are at Lehigh Cement, Mason City, Iowa, and North Texas Cement, Whitewright, Texas. The Texas Cement plant was never constructed, but Lehigh is in operation.

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 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 (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. 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 new greenfield installations in which optimum designs can be 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 C_3S 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.

3.4.2 Theory of Abatement

It should be noted that the calcium oxide and limestone in the kiln feed acts as a natural absorbent of some of the SO_2 emissions produced from fuel combustion and pyrite 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 SAC 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 C_3S 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 Cost 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	101	27.5	8,790	86,887	Yes	No	Yes
Wet Absorbent**	40	5.7	3.06	709.7	124,518	No	No	No
Dry Absorbent	60.5	86	1.98	626.6	7,271	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, SAC proposes as BACT for SO_2 the inherently low-emitting process 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 SAC 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

SNCR has been employed at a number of European cement plants for NO_x reduction. SAC has also tested SNCR at its existing facility in conjunction with multi-stage combustion (MSC) and without MSC utilized. The results from short-term testing at SAC 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. SAC 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 SAC 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 at 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 as result of naturally occurring ammonia in the kiln feed.

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.

No full scale SNCR control has yet been employed in the US, but several short-term trials have been conducted with mixed results. This is due to the carbon and sulfides in kiln feed. Several plants are currently required to install SNCR under PSD-BACT review.

SAC has conducted trials on the existing kiln to determine the effectiveness of SNCR and determine the required reagent injection rate. These short-term tests have 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 an emission reduction from a baseline of 2.8 to 2.5 lb/ton of clinker using only MSC to 2.0 lb/ton with 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 at SAC has 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 NO_x prior to SNCR results in a minimization of reagent used 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 SAC, SNCR in conjunction with low NO_x burners and staged combustion principles, resulted in NO_x emissions at or around 2.0 lb/ton. 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 fabric filter 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 recirculating dust load and potential fouling. Location at the fabric filter exit requires reheating of the gases to the required temperature for catalyst activation.

Dirty Side

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

Installation of the catalyst after the pollution control device reduces the potential for fouling from meal/recirculating 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

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 SCR's 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), while acknowledging that there are no installations of SCR technology in cement plants in the United States, 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 SCR, however, this assumed efficiency is unproven 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. 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, experience with SCR limits the availability of such a technology without long-term testing to determine the applicability and long-term reductions of NO_x in a cement plant.

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 fabric filter 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

Indirect-firing and a low NO_x main kiln burner will be used on the SAC 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

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

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

This technology applies to coal/coke direct-fired kilns not currently using a fuel-rich primary combustion technology. Since the SAC 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

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

1. Community acceptance of tire burning.
2. Reduced sulfur retention in the clinker, increasing 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 Staged Combustion (SC)

4.8.1 Description of Technology

SC 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 (not a problem at SAC). Another form of SC combines high temperature combustion and reburning 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

Staged combustion 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 SC 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 SC kilns.

Research and actual emission monitoring on preheater/precalciner cement kilns have shown that SC technology applied to the area of the precalciner works to effectively lower NO_x emissions per unit clinker produced. Although potential disadvantages to SC 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 SC 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).

SC can have limitations under specific conditions which affect the potential NO_x control effectiveness. In kiln systems employing a mix that has a high sulfur to alkali molar ratio, the volatility of sulfur is increased due to the strong reducing conditions in SC and the relatively low O_2 content in the system. This causes severe preheater plugging. The required conditions for optimum SC operation (low excess oxygen), conflict with preventing sulfur deposition. In order to operate the preheater a higher oxygen content at the calciner exit can be required. These problems have been documented in Europe and U.S. facilities. A high S/alkali molar feed ratio prevents the achievement of maximum NO_x reduction using SC.

Another type of SC 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 reburning 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

A form of SC (i.e., MSC or reducing zone) will be used on the SAC kiln in combination with indirect firing, low NO_x burners, and SNCR. The use of 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)
- SC (currently planned).

4.10 Review of Recent Permit Limits

Table 4-1 summarizes the NO_x BACT determinations made for cement kilns since 2000.

4.11 Summary of Impact Analysis

Table 4-2 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 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

TABLE 4-2. 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	422	4.60	9,117	21,599	Yes	No	Yes
SNCR	20	264	1.52	1,050	3,978	Yes	No	No

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

4.12 Selection of BACT

SAC proposes as BACT the use of indirect firing, low-NO_x burners, SC, and SNCR. The requested BACT emission limit is 2.0 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.

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 is defined by the process technology and feed materials.

5.1 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 condensible 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 spacial 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.

SAC is currently testing injection of fly ash 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. SAC intends to have the ability to inject some portion of fly ash into the calciner region of the 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 SAC 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 SC 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 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 SAC 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

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 Crushed Stone - Kiln 2		Brooksville, FL	Proposed		4.00	GC
Florida Rock Industries, Inc. - Kiln 1	Thompson S. Baker Plant	Newberry, FL	Existing	294.20	3.62	GC
Florida Rock Industries, Inc. - Kiln 2	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	Luceme 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 Crushed Stone - Kiln 2		Brooksville, FL	Proposed		0.19	GC
Florida Rock Industries, Inc. - Kiln 1	Thompson S. Baker Plant	Newberry, FL	Existing	9.8	0.12	GC
Florida Rock Industries, Inc. - Kiln 2	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

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, unusual maintenance problems. In some cases under high hydrocarbon loads, the unit has experienced 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 0.3 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 150°F 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., 285°F). 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 Cost 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	2005	23.7	9,972	4,972	Yes	No	Yes
RTO/CO	79.1	1670	23.7	10,004	5,990	Yes	No	Yes
RTO/VOC	95	63.3	23.7	9,972	165,747	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 technical applicability. SAC 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 by CEM. Compliance with the CO limit would be by annual source test. The requested CO limit is higher than the CO limit for the current kiln because of the adverse effect the SNCR has on CO levels.

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}, 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/cooler Material processing Process fugitives	0.13 lb/ton dry preheater feed 0.01 gr/dscf NA	10 5 10	Baghouse Baghouses BMP
Particulate Matter (PM_{10})	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 average	NA	Process, hydrated lime injection
Nitrogen Oxides (NO_x)	Kiln	2.0 lb/ton clinker, 30-day average	NA	SNCR, SC, Low NO_x burner
Carbon Monoxide (CO)	Kiln	4.0 lb/ton clinker, 30-day average	NA	Good combustion
Organic Compounds (VOC)	Kiln	0.12 lb/ton clinker, 30-day average	NA	Good combustion

[1]Emission limits apply to all combinations of fuel being burned.

APPENDIX A

COST CALCULATIONS FOR SO_2

KILN PRODUCTION AND SO2 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
SAC	2	1,055,467	1,055,467	126.8	126.8	8,322	142	0.27	34.2	45.2	227,273	164,058

SUMMARY OF SO2 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
SAC	2	142	0.27	DRY ABSORBENT ADDITION	60.5	86	1,981,620	626,595	7,271	0.59
		142	0.27	WET ABSORBENT ADDITION*	40	5.7	3,056,400	709,691	124,518	0.67
		142	0.27	WET SCRUBBER**	71.0	101	27,462,404	8,790,089	86,887	8.33

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 SO2 CONCENTRATION AT CONTROL POINT

PLANT NAME	KILN NO.	WET SCRUBBER INLET PPM	WET LIME PPM	WET LIME LOCATION	DRY LIME PPM	DRY LIME LOCATION
SAC	1	45.2	27	CT/MILL DOWN	27	DOWNCOMER

SUMMARY OF CONTROL OPTIONS
SO2 EMISSION FACTORS

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

SUWANNEE AMERICAN CEMENT
DESIGN DATA

PRODUCTION	2,761	MT/D	3,043.2	ST/D
EQUIVALENT	346.8	Days/yr	346.8	Days/yr
	957,513	Tonnes/yr	1,055,467	ST/YR
PLANT CAPACITY	95.0	%	126.80	ST/HR
SO2 FACTOR	0.14	Kg/Tonne	0.27	LB/TON
SO2 ANNUAL EMISSIONS	129.3	Tonnes/yr	142.5	TON/YR
AVERAGE HOURLY	15.5	Kg/HR	34.2	LB/HR
MAX HOURLY MILL-IN			32.5	LB/HR
MAX HOURLY MILL-OUT			65.1	LB/HR
RATIO			2	
OPERATING HOURS	8,322			
MILL-IN	7,884			
MILL-DOWN	438			

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

MILL DOWN ONLY

INLET GAS STREAM
INLET GASES FROM KILN PREHEATER CYCLONE

	194,514	NM3/HR	125,314	SCFM
	488,459	M3/HR	293,112	ACFM
H2O	14,256	NM3/HR	9,184	WSCFM
DRY GAS	180,258	NM3/HR	116,130	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	10.1	3.3	0.5	0.2	0.2347	0.0625	95	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	194514	122277	9767	4440			2,305,964	2188

WATER ADDED — SO2 26.72 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	22.91	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	3	2.0	0.3	0.1	0.2214	0.059	33	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	214390	134772	10351	4705			2,305,964	2188

DIFFERENCE 0

OPERATION	438	HR/YR	MILL-DOWN
PRODUCTION	2,761	TONNES/DAY	
	115.03	TONNES/HR	
SO2 UNCONTROLLED	0.5656	KG/TONNE	
	29.5741	KG/HR	
	65.0630	LB/HR	
	14.2488	T/YR	MILL-DOWN

SO2 REMOVED	11.8296 KG/HR	
	26.0252 LB/HR	
	0.1028 KG/KG CLINKER	
	5.700 T/YR	
CONTROLLED SO2	18 KG/HR	
	39.04 LB/HR	
	8.55 T/YR	
LIME INJECTION RATE	2.5 LB Ca/LB S	
	81 LB/HR Ca	
	150 LB/HR Ca(OH)2	
H2O	35028 LB/HR	
	30660 GAL/YR	
TOTAL	35178 LB/HR	
SLURRY SOLIDS	0.43 %	
PARTICLE SIZE	25 um	
SO2 REMOVAL EFFICIENCY	40 %	AVERAGE
	100 %	AVAILABILITY
	40 %	ANNUAL
GYPSUM FORMATION	55 LB/HR	
LIME REACTED	30 LB/HR	
UNREACTED LIME	51 LB/HR	
LOADING TO BAGHOUSE	106 LB/HR	
BAGHOUSE REMOVAL	100 %	
COLLECTED DUST	106.2 LB/HR	
WASTE DUST	0 T/YR	RETURNED
LIME USED	33 T/YR	
	1.431 LOADS/YR	
TRUCKS	242.37 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	1,055,467	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	33	T/YR
	COST	60.00	$/TON
	ANNUAL COST	1,975	$/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	$158,420

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	709,691
ANNUAL EMISSIONS REDUCTION		TON/YR	5.70
COST BENEFIT		$/TON	124,518

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	6.5	1.1	0.005
NO	0.0	0.0	0.0
CO	116.3	8.5	0.080
	144538.7	11103.5	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	6.5	1.1	0.0
NO	0.0	0.0	0.0
CO	116.3	8.5	0.1
	125314.3	10519.7	100.0
NM3/HR	194514.0		

3 TARGET

DRY LIME INJECTION SYSTEM
(DRY SCRUBBING)

OPERATION	438	HR/YR	MILL-OUT CONDITION	
PRODUCTION	2,761	TONNES/DAY		
	115.03	TONNES/HR		
SO2 UNCONTROLLED	0.257094	KG/TONNE		
	29.57411	KG/HR		
	65.06303	LB/HR		
	14.2488	T/YR	MILL-DOWN	
				TEMP
SO2 REMOVED	60.5	%	AVE	412.8 C
	100	%	AVAILABILITY	
	60.5	%	ANNUAL	
SO2 REMOVED	17.88616	KG/HR		
	39.34955	LB/HR		
	0.155488	KG/KG CLINKER		
	8.62	T/YR		
CONTROLLED SO2	12	KG/HR		
	26	LB/HR		
	5.63	T/YR	MILL-DOWN	
LIME INJECTION RATE	15	LB Ca/LB S		
	488	LB/HR Ca		
	902	LB/HR Ca(OH)2		
GYPSUM FORMATION	84	LB/HR		
LIME REACTED	46	LB/HR		
UNREACTED LIME	442	LB/HR		
LOADING TO CYCLONE	526	LB/HR		
CYCLONE REMOVAL	0	%		
COLLECTED DUST	0.0	LB/HR		
WASTE DUST	0	T/YR	RETURNED TO PROCESS	
LIME USED	197	T/YR		
	8.6	LOADS/YR		
TRUCKS	40.40	DAYS		

DRY LIME INJECTION SYSTEM
(DRY SCRUBBING)

OPERATION	7884	HR/YR	MILL-IN CONDITION	
PRODUCTION	2,761	TONNES/DAY		
	115.03	TONNES/HR		
SO2 UNCONTROLLED	0.128547	KG/TONNE		
	14.78705	KG/HR		
	32.53152	LB/HR		
	128.2392	T/YR	MILL-IN	
				TEMP
SO2 REMOVED	60.5	%	AVE	412.8 C
	100	%	AVAILABILITY	
	60.5	%	ANNUAL	
SO2 REMOVED	8.943081	KG/HR		
	19.67478	LB/HR		
	0.077744	KG/KG CLINKER		
	77.56	T/YR		
CONTROLLED SO2	6	KG/HR		
	13	LB/HR		
	50.68	T/YR	MILL-IN	
LIME INJECTION RATE	15	LB Ca/LB S		
	244	LB/HR Ca		
	451	LB/HR Ca(OH)2		
GYPSUM FORMATION	42	LB/HR		
LIME REACTED	23	LB/HR		
UNREACTED LIME	221	LB/HR		
LOADING TO CYCLONE	263	LB/HR		
CYCLONE REMOVAL	0	%		
COLLECTED DUST	0.0	LB/HR		
WASTE DUST	0	T/YR	RETURNED TO PROCESS	
LIME USED	1777	T/YR		
	77.3	LOADS/YR		
TRUCKS	4.49	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	1,055,467	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	1,975	TON/YR
	COST	60.00	$/TON
	ANNUAL COST	118,485	$/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	$264,553

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	626,595
ANNUAL EMISSIONS REDUCTION		TON/YR	86.18
COST BENEFIT		$/TONNE	7,271

ESIGN 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	0.005	12.0	6.5	1.08	0.5	0.2071	0.0551	32	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	229957	144557	11103	5047			1,491,402	1415

SATURATION	0.113 LB/LB-DA		SO2 PPM	45.2
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	38955	24488.4	1143.8	519.9	1111.7	532.6	1,271,504	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	2	1.3	0.2	0.1	0.2048	0.055	4	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	234381	147338	11234	5106			1,491,402	1415

SO2 REMOVED	52.05	LB/HR
HR/YR	438	HR/YR
	11.40	T/YR

DIFFERENCE 0

INLET GAS VOLUME	4649	AM3/MIN
	164058	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
	8714.5	GAL/MIN
HEAD	21.3	M
NSITY	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		23.7	KG/HR	
SULFUR		11.8	KG/HR	
GYPSUM		50.5	KG/HR	ANHYDRATE
		63.8	KG/HR	HYDRATED
WATER		13.3	KG/HR	HYDRATED
PRODUCTION		2,761	TONNE/DAY	
		115.0	TONNE/HR	
GYPSUM		0.55	KG/TONNE	
		265	TONNE/YR	
FREE MOISTURE		10	%	
REAGENT USAG CaCO3		37.2	KG/HR	
		0.3	KG/TONNE	
		154.6	TONNE/YR	
WATER LOSS	FREE	6.4	KG/HR	
	HYDRATE	13.3	KG/HR	
STACK WATER LOSS		3572.9	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		15,309	KG/HR	
		0.26	M3/MIN	
		67.31	GPM	

SO_2 REMOVAL	BASELINE	0.135	KG/TONNE
	PRODUCTION	957,513	TONNE/YR
		129	TONNE/YR
		142	T/YR
	CONTROLLED	26	TONNE/YR
		28	T/YR
	REDUCTION	103	TONNE/YR
		114	T/YR

B. STEAM ENTHALPY AT ATMOSPHERIC PRESSURE

	A0	A1	A2	C
H_2O	4.5630E-01	1.6660E-05	2.2320E-07	1.0690E+03

SIGN 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	h KJ/MIN
H2O	8.00	24283.5	15265.3	713.0	324.1	1100.8	527.4	784,861	745
CO2	20.00	60708.7	38163.2	4361.5	1982.5	0.2037	0.0542	61,887	59
O2	6.00	18212.6	11449.0	950.1	431.9	0.2150	0.0572	14,232	14
N2	65.93	200119.7	125800.8	9142.5	4155.7	0.2471	0.0658	157,396	149
SO2	0.002	6.0	3.3	0.54	0.2	0.2037	0.0542	8	0
NO	0.00	0.0	0.0	0.0	0.0	0.2037	0.0542	0	0
CO	0.07	213.1	116.3	8.5	3.8	0.2037	0.0542	120	0
TOTAL	100.00	303544	190816	15176	6898			1,018,504	966

SATURATION	0.050 LB/LB-DA		SO2 PPM	17.1
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	h KJ/MIN
H2O	8.18	24862	15628.8	730.0	331.8	1098.5	526.3	801,871	761
CO2	21.74	60709	38163.2	4361.5	1982.5	0.2034	0.054	57,345	54
O2	6.52	18213	11449.0	950.1	431.9	0.2150	0.057	13,200	13
N2	71.67	200120	125800.8	9142.5	4155.7	0.2471	0.066	145,976	138
SO2	0.00	2	1.0	0.2	0.1	0.2034	0.054	2	0
NO	0.00	0	0.0	0.0	0.0	0.2034	0.054	0	0
CO	0.07	185	116.3	8.5	3.8	0.2034	0.054	111	0
TOTAL	100	304089	191159	15193	6906			1,018,504	966

SO2 REMOVED	22.77 LB/HR
HR/YR	7884 HR/YR
	89.77 T/YR

DIFFERENCE 0

INLET GAS VOLUME	5734 AM3/MIN
	202498 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
	10748.5 GAL/MIN
HEAD	21.3 M
SITY	1.15

DATION BLOWER		3	M3/M3	
		122.66	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		10.4	KG/HR	
SULFUR		5.2	KG/HR	
GYPSUM		22.1	KG/HR	ANHYDRATE
		27.9	KG/HR	HYDRATED
WATER		5.8	KG/HR	HYDRATED
DUCTION		2,761	TONNE/DAY	
		115.0	TONNE/HR	
GYPSUM		0.24	KG/TONNE	
		116	TONNE/YR	
FREE MOISTURE		10	%	
REAGENT USAGE	CaCO3	16.3	KG/HR	
		0.1	KG/TONNE	
		67.6	TONNE/YR	
WATER LOSS	FREE	2.8	KG/HR	
	HYDRATE	5.8	KG/HR	
STACK WATER LOSS		463.0	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		14,923	KG/HR	
		0.25	M3/MIN	
		65.61	GPM	

SO2 REMOVAL	BASELINE	0.135	KG/TONNE
	PRODUCTION	957,513	TONNE/YR
		129	TONNE/YR
		142	T/YR
	CONTROLLED	39	TONNE/YR
		43	T/YR
	REDUCTION	90	TONNE/YR
		100	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

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	0.16	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	201619.35	ACFM
	344224.19	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	0.16	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	19.34	21.03
TOTAL	14898.51	6772.050	893910.57	181445.31	288637.2		
H2O	739.49	336.130	44369.14	15832.39	25185.6	8.03	
TOTAL	15638.00	7108.180	938279.72	197277.70	313822.8	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	16894.82	26875.7		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	0.16	0.33	0.15	1.96	3.1	0.00	0.00	10.8
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	15545.28	15662.49	7119.31	197865.68			100.00	
TOTAL(DRY)						180970.86		100.00		

HEAT BALANCE FOR REHEAT FLUE GASES (WET SCRUBBER)

MASS BALANCE 36.4 PPM NOX

	LB/MIN	KG/MIN	
SOURCE GASES	15192.72	6905.781818	
COMBUSTION AIR	445.28	202.3978477	
N.GAS	23.93	10.87517193	
TOTAL	15661.92	7119.054837	
COMBUSTION PRODUCTS	15662.49	7119.313916	
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	0.16	0.073935266	1.35	0
NO	0.2034	0.054	96.63	0.00	0	0.00	0
H2O	1098.5	526.2766	96.63	729.98	331.807226	801871.25	761
TOTAL				15192.72	6905.781818	1,018,504	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						1032798	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		1,579,338
RADIATION LOSSES	2.00	31,587
NET ENTHALPY FLUE GASES		1,547,751

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	0.33	0.1	8	0	0.00	2.0	3.1	
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	909453	863	5.04	16894.8	26875.7	
TOTAL				15662.49	7119.3	1547751	1468	100	197808.2	314666.7	

NET DIFFERENCE 0

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	279373	191250	304235	244496	417395
OUTLET	180971	287882	197866	314758	252953	431833

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	1,055,467	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	244496	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	755,124	$/YR
	N.GAS(FLUE GAS REHEAT)	33.40	GJ/HR
	COST	6.266	$/GJ
	ANNUAL COST	1,741,851	$/YR
REAGENT	REAGENT USAGE	154.63	TON/YR
	COST	25.00	$/TON
	ANNUAL COST	3,866	$/YR
WASTE DISPOSAL	GYPSUM	265	TON/YR
		65.00	$/TON
	COST	17251	$/YR
WATER TREATMENT	DISCHARGE	97811	M3/YR
	COST	2.00	$/M3
	ANNUAL COST	195622	$/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	$3,902,362

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	8,790,089
ANNUAL EMISSIONS REDUCTION		TON/YR	101.17
COST BENEFIT		$/TON	86,887

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

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	NOx LB/TON	NOx AVG LB/HR
SAC	2	1,055,467	1,055,467	126.8	126.8	8,322	1,319	2.50	317.1

SUMMARY OF NOx CONTROL COST DATA

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
SAC	2	1,319	2.50	SCR*	32	422	4,598,000	9,116,801	21,594	8.64
		1,319	2.50	SNCR	20	264	1,519,560	1,049,696	3,978	0.99

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.

SUWANNEE AMERICAN CEMENT
DESIGN DATA

PRODUCTION	2,761 MT/D	3,043.2 ST/D
	346.8 Days/yr	346.8 Days/yr
	957,513 Tonnes/yr	1,055,467 ST/YR
PLANT CAPACITY	95.0 %	126.80 ST/HR
NOx FACTOR (MSC ONLY)	1.25 Kg/Tonne	2.50 LB/TON
NOx ANNUAL EMISSIONS	1,196.9 Tonnes/yr	1,319.3 TON/YR
	143.8 Kg/HR	317.1 LB/HR
OPERATING HOURS	8,322	

COST ESTIMATE
SNCR NOX CONTROL OPTION

			FACTOR	COST
CAPITAL COSTS				
DIRECT COST				
	BASIC	UREA 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	492	T/YR
	UNIT COST	0.12	$/LB
	COST	$118,003	
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			612,404

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	$1,049,696
EXPECTED NOx		LB/TON	2.00
		T/YR	1055
REDUCTION		T/YR	264
		%	20
		$/TON	$3,978
		$/TON-CLK	$0.99

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	787	T/YR
	UNIT COST	0.12	$/LB
	COST	$188,804	

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			8,137,508

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	$9,116,801
EXPECTED NOx		LB/TON	1.70
		T/YR	897
REDUCTION		T/YR	422
		%	32
		$/TON	$21,594
		$/TON-CLK	$8.64

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

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	507.3	507.3	606.6	8322	2,110.9	NA
CO	A	RTO	95.0	507.3	25.4	30.5	8322	105.5	2,005.4
CO	B	RTO	79.1	507.3	106.0	127.3	8322	440.9	1,670.0
VOC	0	PROCESS	NA	15.2	15.22	NA	8322	63.3	NA
VOC	A	RTO	95.0	15.2	0.76	NA	8322	3.2	60.2

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

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	2,110.9	2,005.4	23,744,620	4,853,375	9,971,593	4,972
CO	B	79.1	10	10	2,110.9	1,670.0	23,744,620	4,885,979	10,004,197	5,990
VOC	A	95.0	10	10	63.3	60.2	23,744,620	4,853,375	9,971,593	165,747

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	195,556	SCFM
FLOW PER MODULE	39,111	SCFM
CLINKER PRODUCTION	3,043	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	116	8.5	0.06	0.06
O2	11,733	973.7	6.52	6.00
N2	128,947	9364.4	71.67	65.94
SO2	3	0.57	0.00	0.00
NO	0	0.0	0.00	0.00
H2O	15,644	730.7		8.00
CO2	39,111	4469.9	21.74	20.00
TOTAL	195,556	15547.6	100.00	100.00

FLOW	250,000	ACFM
	195,556	WSCFM
	179,912	DSCFM
TEMP	215	oF

ALLOWABLES		3043.2	T/D	
		126.80	T/HR	
		1,055,467	T/YR	
	SO2	142.49	T/YR	
		0.27	LB/TON	ANNUAL AVERAGE
		34.2	LB/HR	ANNUAL AVERAGE
				SHORT TERM
	CO	2110.93	T/YR	
		4.00	LB/TON	ANNUAL AVERAGE
		507.3	LB/HR	ANNUAL AVERAGE
		761.0	LB/HR	SHORT TERM @1.5X
	VOC	63.33	T/YR	
		0.12	LB/TON	ANNUAL AVERAGE
		15.22	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	8.46	507.31	116.34	0.06	594.9	646.7
O2	973.72	58423.37	11733.36	4.00		
N2	9364.36	561861.34	128947.18	65.94		
SO2	0.57	34.24	3.44	0.00	17.6	
NO	0.00	0.00	0.00	0.00	0.0	
H2O	730.69	43841.20	15644.00	8.00		
CO2	4469.85	268191.09	39111.20	20.00		
TOTAL(WET)	15547.64	932858.55	195556	100.00		
TOTAL(DRY)	14816.96	889017.35	179912			

STACK 250000 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	8.46	507.31	116.34	0.06	0.06	606.6
O2	1180.12	70807.33	14221.26	6.85	7.41	
N2	10047.61	602856.51	138348.74	66.63	72.13	
SO2	0.57	34.24	3.44	0.00	0.00	17.93
NO	0.00	0.00	0.00	0.00	0.00	0
CO2	4469.85	268191.09	39111.20	18.83	20.39	
TOTAL	15706.61	942396.48	191800.98			
H2O	740.39	44423.65	15851.84	7.63		
TOTAL	16447.00	986820.12	207652.82	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	34,853	BTU/MIN	3.13 %
	2,091,174	BTU/HR	
N.G.	1,078,366	BTU/MIN	96.87 %
	64,701,970	BTU/HR	
TOTAL	1,113,219	BTU/MIN	
	66,793,144	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	4.58	0.00	4.58
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	4.58	186.38	190.96
O2 BOUND	4.83	0.77	5.60
O2 EXCESS			-185.35
COMBUSTION AIR			1180.12
NET O2 EXCESS			994.77

DESTRUCTION EFFICIENCY	95.00 %	CLINKER RATE	126.80 TON/HR
OPERATING HOURS	8322 HR/YR	EMISSION FACTOR	0.20 LB/TON
LB/HR ABATED	481.95 LB/HR	LB/HR EMITTED	25.37 LB/HR
TON/YR ABATED	2005.39 TON/YR	TON/YR EMITTED	105.55 TON/YR

FLUE GAS PRODUCTS

	GASES	N.G.	INPUT	TOTAL	SCFM	%DRY	%WET	PPM DRY
CO2	12.60	123.57	4469.85	4606.02	40355.63	21.16	19.33	
CO	0.00	0.00	0.42	0.42	5.82	0.00	0.00	30.5
H2O	0.00	101.31	740.39	841.70	18020.88		8.63	
N2	0.00	0.00	10047.61	10047.37	138364.33	72.55	66.29	
O2 EXCES	0.00	0.00	994.77	994.77	11981.98	6.28	5.74	
SO2	0.00	0.33	0.57	0.90	5.44	0.00	0.00	28.5
NO	0.00	0.51	0.00	0.51	4.29	0.00	0.00	22.5
TOTAL	12.60	225.72	16253.62	16491.70	208738.37		100.00	
TOTAL(DRY)					190717.48	100.00		

MASS BALANCE

34.5 PPM NOX

SOURCE GASES	15547.64 LB/MIN
COMBUSTION AIR	899.36 LB/MIN
N.GAS	48.85 LB/MIN
TOTAL	16495.85 LB/MIN
COMBUSTION PRODUCTS	16491.70 LB/MIN
DIFFERENCE	0.03 %

INPUT ENTHALPY FLUE GASES

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2484	215.00	9364.36	425,617
O2	0.2162	215.00	973.72	38,516
CO	0.2089	215.00	8.46	323
CO2	0.2089	215.00	4469.85	170,868
SO2	0.1381	215.00	0.57	14
NO	0.2089	215.00	0.00	0
H2O	1152.5	215.00	730.69	842,121
TOTAL			15547.64	1,477,460

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	9364.36	3348648.63
O2	0.2280	1400.00	973.72	303708.04
CO	0.2634	1400.00	8.46	3046.69
CO2	0.2634	1400.00	4469.85	1610626.93
SO2	0.2362	1400.00	0.57	184.43
NO	0.2634	1400.00	0.00	0.00
H2O	1693.2	1400.00	730.69	1237228.86
TOTAL			15547.64	6,503,444

AVERAGE TEMPERATURE	1400
HEAT GAIN REHEAT	5,025,983

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	6,522,080

	BTU/LB	LB/MIN	h-BTU/MIN
CO	4339.0	8.03	34853
NAT. GAS	22077	48.85	1078366
FUEL TOTAL			1113219

TOTAL		7,635,299
RADIATION LOSSES	2.00	152,706
NET ENTHALPY FLUE GASES		7,482,593

OUTPUT ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	SCFM	PPM(WET)
N2	0.2625	1500.00	10047.37	3,871,754	60.92	138352.28	
O2	0.2290	1500.00	994.77	334,413	6.03	11986.95	
CO2	0.2680	1500.00	4606.02	1,812,118	27.93	40302.66	
CO	0.2680	1500.00	0.42	166	0.00	5.82	27.88
SO2	0.2445	1500.00	0.90	324	0.01	5.44	26.07
NO	0.2680	1500.00	0.51	201	0.00	4.26	20.42
H2O	1738.87	1500.00	841.70	1,463,616	5.10	18020.88	
TOTAL			16491.70	7,482,593	100	208678.287	

NET DIFFERENCE	0

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 6.28 **%**

INLET FUEL CONCENTRATION 5.36 **BTU/SCF**

FLUE GAS VOLUME SUMMARY @ COMBUSTOR

	DSCFM	WSCFM	ACFM
INLET	179911.52	195555.52	688888.76
OUTLET	190717.48	208738.37	774862.11
STACK	190717.48	208738.37	343830.41

STACK ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	PPM(WET)
N2	0.2505	409.71	10047.37	950678.84	60.92	
O2	0.2181	409.71	994.77	81947.08	6.03	
CO2	0.2178	409.71	4606.02	378999.55	27.93	
CO	0.2178	409.71	0.42	34.79	0.00	25.63
SO2	0.1542	409.71	0.90	52.59	0.01	
NO2	0.2178	409.71	0.51	42.13	0.00	
H2O	1241.36	409.71	841.70	1044854.94	5.10	
TOTAL			16491.70	2,456,610	100	

FINAL ENTHALPY	2,456,610	
DIFFERENCE	0	
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

OPERATING COST(DIRECT)

UTILITIES	FAN STATIC PRESSURE	12.10	IN H2O
	FAN VOLUME	343830	ACFM
	FAN	938.94	BHP
	FAN STATIC PRESSURE	5.00	IN H2O
	FAN VOLUME	12097	ACFM
	FAN	13.65	BHP
	CONNECTED LOAD	952.59	BHP
	POWER	710.35	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	250,589	$/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			4,853,375

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE A

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	9,971,593
EMISSIONS REDUCTION		T/YR	2005.39

HEAT BALANCE FOR RTO - CASE B

INPUTS

FLUE GAS STREAM

	LB/MIN	LB/HR	SCFM	%	PPM(WET)	PPM(DRY)
CO	8.46	507.31	116.34	0.06	594.9	646.7
O2	973.72	58423.37	11733.36	6.00		
N2	9364.36	561861.34	128947.18	65.94		
SO2	0.57	34.24	3.44	0.00	17.6	
NO	0.00	0.00	0.00	0.00	0.0	
H2O	730.69	43841.20	15644.00	8.00		
CO2	4469.85	268191.09	39111.20	20.00		
TOTAL(WET)	15547.64	932858.55	195556	100.00		
TOTAL(DRY)	14816.96	889017.35	179912			

STACK 250000 ACFM
215 oF

BURNER COMBUSTION AIR

	LB/MIN		
DRY AIR	898.6		
O2	208.5		65.35 MMBTU/HR
N2	690.1		8.3 LB/1000BTU
H2O	9.8		898.6 LB/MIN
WET AIR	908.4		
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	8.46	507.31	116.34	0.06	0.06	606.20888
O2	1182.20	70932.03	14246.32	6.86	7.42	
N2	10054.49	603269.31	138443.41	66.63	72.14	
SO2	0.57	34.24	3.44	0.00	0.00	17.916975
NO	0.00	0.00	0.00	0.00	0.00	0
CO2	4469.85	268191.09	39111.20	18.82	20.38	
TOTAL	15715.57	942933.98	191920.70			
H2O	740.49	44429.51	15853.93	7.63		
TOTAL	16456.06	987363.49	207774.63	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	29,024	BTU/MIN	2.60 %
	1,741,452	BTU/HR	
N.G.	1,089,225	BTU/MIN	97.40 %
	65,353,490	BTU/HR	
TOTAL	1,118,249	BTU/MIN	
	67,094,942	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	3.81	0.00	3.81
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	3.81	188.26	192.07
O2 BOUND	4.83	0.78	5.61

HEAT BALANCE FOR RTO - CASE B

O2 EXCESS	-186.46
COMBUSTION AIR	1182.20
NET O2 EXCESS	995.74

DESTRUCTION EFFICIENCY	79.11 %	CLINKER RATE	126.80 TON/HR
OPERATING HOURS	8322 HR/YR	EMISSION FACTOR	0.84 LB/TON
LB/HR ABATED	401.35 LB/HR	LB/HR EMITTED	105.97 LB/HR
TON/YR ABATED	1670.01 TON/YR	TON/YR EMITTED	440.92 TON/YR

FLUE GAS PRODUCTS

	GASES	N.G.	INPUT	TOTAL	SCFM	%DRY	%WET	PPM DRY
CO2	10.49	124.81	4469.85	4605.16	40348.07	21.14	19.32	
CO	0.00	0.00	1.77	1.77	24.30	0.01	0.01	127.3
H2O	0.00	102.33	740.49	842.82	18044.82		8.64	
N2	0.00	0.00	10054.49	10054.25	138459.08	72.55	66.29	
O2 EXCES	0.00	0.00	995.74	995.74	11993.72	6.28	5.74	
SO2	0.00	0.34	0.57	0.91	5.46	0.00	0.00	28.6
NO	0.00	0.51	0.00	0.51	4.29	0.00	0.00	22.5
TOTAL	10.49	227.99	16262.91	16501.15	208879.74		100.00	
TOTAL(DRY)					190834.92	100.00		

34.5 PPM NOX

MASS BALANCE

SOURCE GASES	15547.64 LB/MIN
COMBUSTION AIR	908.42 LB/MIN
N.GAS	49.34 LB/MIN
TOTAL	16505.40 LB/MIN
COMBUSTION PRODUCTS	16501.15 LB/MIN
DIFFERENCE	0.03 %

INPUT ENTHALPY FLUE GASES

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN
N2	0.2484	215.00	9364.36	425617.41
O2	0.2162	215.00	973.72	38516.04
CO	0.2089	215.00	8.46	323.22
CO2	0.2089	215.00	4469.85	170868.43
SO2	0.1381	215.00	0.57	14.42
NO	0.2089	215.00	0.00	0.00
H2O	1152.5	215.00	730.69	842120.68
TOTAL			15547.64	1,477,460

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	9364.36	3348648.63
O2	0.2280	1400.00	973.72	303708.04
CO	0.2634	1400.00	8.46	3046.69
CO2	0.2634	1400.00	4469.85	1610626.93
SO2	0.2362	1400.00	0.57	184.43
NO	0.2634	1400.00	0.00	0.00
H2O	1693.2	1400.00	730.69	1237228.86
TOTAL			15547.64	6,503,444

AVERAGE TEMPERATURE	1400
HEAT GAIN REHEAT	5,025,983

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 6,522,268

	BTU/LB	LB/MIN	h-BTU/MIN
CO	4339.0	6.69	29024
NAT. GAS	22077	49.34	1089225
FUEL TOTAL			1118249

TOTAL		7,640,517
RADIATION LOSSES	2.00	152,810
NET ENTHALPY FLUE GASES		7,487,707

OUTPUT ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	SCFM	PPM(WET)
N2	0.2625	1500.00	10054.25	3874405.06	60.93	138447.02	
O2	0.2290	1500.00	995.74	334740.81	6.03	11998.699	
CO2	0.2680	1500.00	4605.16	1811778.81	27.91	40295.113	
CO	0.2680	1500.00	1.77	694.82	0.01	24.301405	116.38
SO2	0.2445	1500.00	0.91	325.27	0.01	5.4599974	
NO	0.2680	1500.00	0.51	201.46	0.00	4.2603612	
H2O	1738.87	1500.00	842.82	1465560.35	5.11	18044.816	
TOTAL			16501.15	7,487,707	100	208819.67	

NET DIFFERENCE 0

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 6.28 **%**

INLET FUEL CONCENTRATION 5.38 **BTU/SCF**

FLUE GAS VOLUME SUMMARY @ COMBUSTOR

	DSCFM	WSCFM	ACFM
INLET	179911.52	195555.52	688888.76
OUTLET	190834.92	208879.74	775386.91
STACK	190834.92	208879.74	344338.29

STACK ENTHALPY

	Cp-BTU/LB-oF	T-oF	LB/MIN	h-BTU/MIN	% wt	PPM(WET)
N2	0.2505	410.41	10054.25	953109.78	60.93	
O2	0.2181	410.41	995.74	82180.98	6.03	
CO2	0.2179	410.41	4605.16	379681.70	27.91	
CO	0.2179	410.41	1.77	145.61	0.01	107.03
SO2	0.1543	410.41	0.91	52.91	0.01	
NO2	0.2179	410.41	0.51	42.22	0.00	
H2O	1241.67	410.41	842.82	1046510.00	5.11	
TOTAL			16501.15	2,461,723	100	

FINAL ENTHALPY	2,461,723
DIFFERENCE	0
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

OPERATING COST(DIRECT)

UTILITIES	FAN STATIC PRESSURE	12.10	IN H2O
	FAN VOLUME	344338	ACFM
	FAN	940.21	BHP
	FAN STATIC PRESSURE	5.00	IN H2O
	FAN VOLUME	12219	ACFM
	FAN	13.79	BHP
	CONNECTED LOAD	954.00	BHP
	POWER	711.40	KWHr
	HOURS OPERATED	8322	HRS
	ELECTRICAL COST	0.0424	$/KWHr
	ANNUAL COST	250,959	$/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			4,885,979

COST ESTIMATE
REGENERATIVE THERMAL OXIDIZER - CASE B

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	10,004,197
EMISSIONS REDUCTION		T/YR	1670.01

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