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BUREAU OF AIR REGULATION

PSD PERMIT APPLICATION
FOR
PETCOKE BURNING IN THE LIME KILN

SMURFIT-STONE CONTAINER ENTERPRISES
PANAMA CITY MILL

Prepared For:

SMURFIT-STONE CONTAINER ENTERPRISES, INC.
PANAMA CITY, FLORIDA

Prepared By:

Golder Associates Inc.
6241 NW 23rd Street, Suite 500
Gainesville, Florida 32653-1500

February 2007

0637645

7 Copies – FDEP
2 Copies – SSCE
1 Copy - Golder

APPLICATION FOR AIR PERMIT – LONG FORM

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – Use this form to apply for an air construction permit at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air permit. Also use this form to apply for an air construction permit:

- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- Where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- Where the applicant proposes to establish, revise, or renew a plantwide applicability limit (PAL).

Air Operation Permit – Use this form to apply for:

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

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

To ensure accuracy, please see form instructions.

Identification of Facility

1. Facility Owner/Company Name: Smurfit-Stone Container Enterprises, Inc.	
2. Site Name: Panama City Mill	
3. Facility Identification Number: 0050009	
4. Facility Location...: Street Address or Other Locator: One Everitt Avenue City: Panama City County: Bay Zip Code: 32402	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: Tom Clements, Environmental Superintendent
2. Application Contact Mailing Address... Organization/Firm: Smurfit-Stone Container Enterprises, Inc. Street Address: One Everitt Avenue City: Panama City State: FL Zip Code: 32402
3. Application Contact Telephone Numbers... Telephone: (850) 785-4311 ext.470 Fax: (850) 763-8530
4. Application Contact Email Address: tmclemen@smurfit.com

Application Processing Information (DEP Use)

1. Date of Receipt of Application: 2/23/07	3. PSD Number (if applicable): PSD-FL-388
2. Project Number(s): 0050009-038-AC	4. Siting Number (if applicable):

APPLICATION INFORMATION

Purpose of Application

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

Air Construction Permit

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

Air Operation Permit

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

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

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

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

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

Application Comment

This application is for the ability to substitute up to 90 percent petcoke for No. 6 fuel oil and Natural Gas in the Lime Kiln (EU 004), along with the installation of new burners into the Lime Kiln in order to be able to fire the petcoke. The project also includes the installation of petcoke handling and storage facilities, along with an accompanying baghouse. Based on ambient air quality modeling, the maximum allowable SO_2 emission rates for the Nos. 3 and 4 Combination Boilers will be reduced in order to account for the effect of the planned enclosure of the Recovery Boilers building.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
004	Lime Kiln/NCG Collection	AC1A	
	Petcoke Storage Silo	AC1A	
015	No. 3 Combination Boiler	AC1A	
016	No. 4 Combination Boiler	AC1A	

Application Processing Fee

Check one: ☒ Attached - Amount: $ 7,500 ☐ Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

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

1. Owner/Authorized Representative Name :
   B. G. Sammons, General Manager
2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: Smurfit-Stone Container Enterprises, Inc.
   Street Address: One Everitt Avenue
   City: Panama City State: FL Zip Code: 32402
3. Owner/Authorized Representative Telephone Numbers...
   Telephone: (850) 785-4311 ext. Fax: (850) 763-6290
4. Owner/Authorized Representative Email Address: bsammons@smurfit.com
5. Owner/Authorized Representative Statement:

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

   B G Sammons
   Signature

   2/21/07
   Date

APPLICATION INFORMATION

Application Responsible Official Certification

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

1. Application Responsible Official Name:

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):
   - ☐ For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C.
   - ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
   - ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
   - ☐ The designated representative at an Acid Rain source.

3. Application Responsible Official Mailing Address...
   Organization/Firm:
   Street Address:
   City: State: Zip Code:

4. Application Responsible Official Telephone Numbers...
   Telephone: ( ) - ext. Fax: ( ) -

5. Application Responsible Official Email Address:

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

   ____________________ ________________
   Signature Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **David A. Buff**
   Registration Number: **19011**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Golder Associates Inc.****
   Street Address: **6241 N.W. 23rd Street, Suite 500**
   City: **Gainesville** State: **Florida** Zip Code: **32653**
3. Professional Engineer Telephone Numbers...
   Telephone: **(352) 336-5600** ext.**545** Fax: **(352) 336-6603**
4. Professional Engineer Email Address: **dbuff@golder.com**
5. Professional Engineer Statement:

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

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

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

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

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

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

David A. Buff
Signature

2/19/07
Date

(seal)

* Attach any exception to certification statement.

**** Board of Professional Engineers Certificate of Authorization #00001670**

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone 16 East (km) 632.8 North (km) 3335.1		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) 30 / 08 / 30 Longitude (DD/MM/SS) 85 / 37 / 25	
3. Governmental Facility Code: 0	4. Facility Status Code: A	5. Facility Major Group SIC Code: 26	6. Facility SIC(s): 2611 2621
7. Facility Comment : This facility is in the Kraft Paper and Bleached Paper Grade subcategories of the pulp and paper industry.			

Facility Contact

1. Facility Contact Name: Tom Clements
2. Facility Contact Mailing Address... Organization/Firm: Smurfit-Stone Container Enterprises, Inc. Street Address: One Everitt Avenue City: Panama City State: FL Zip Code: 32402
3. Facility Contact Telephone Numbers: Telephone: (850) 785-4311 ext.470 Fax: (850) 763-8530
4. Facility Contact Email Address: tmclemen@smurfit.com

Facility Primary Responsible Official

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

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

FACILITY INFORMATION

Facility Regulatory Classifications

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

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

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
Particulate Matter Total – PM	A	N
Particulate Matter – PM_{10}	A	N
Sulfur Dioxide – SO_2	A	N
Nitrogen Oxides – NO_x	A	N
Carbon Monoxide – CO	A	N
Volatile Organic Compounds - VOC	A	N
Total Reduced Sulfur – TRS	A	N
Sulfuric Acid Mist – SAM	A	N
Total Hazardous Air Pollutants – HAPs	A	N
Mercury – H114	B	N
Acetaldehyde – H001	A	N
Chlorine – H038	B	N
Chloroform – H043	B	N
Formaldehyde – H095	A	N
Hydrochloric Acid – H106	A	N
Methanol – H115	A	N
1, 2, 4 – Trichlorodenzene – H174	A	N
Xylenes – H186	A	N

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

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

C. FACILITY ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1.	Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **SSCE-FI-C1** ☐ Previously Submitted, Date:____
2.	Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **SSCE-FI-C2** ☐ Previously Submitted, Date:____
3.	Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **SSCE-FI-C3** ☐ Previously Submitted, Date:____

Additional Requirements for Air Construction Permit Applications

1.	Area Map Showing Facility Location: ☒ Attached, Document ID: **SSCE-FI-CC1** ☐ Not Applicable (existing permitted facility)
2.	Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): ☒ Attached, Document ID: **PSD Report**
3.	Rule Applicability Analysis: ☒ Attached, Document ID: **SSCE-FI-CC3**
4.	List of Exempt Emissions Units (Rule 62-210.300(3), F.A.C.): ☐ Attached, Document ID: ____ ☒ Not Applicable (no exempt units at facility)
5.	Fugitive Emissions Identification: ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
6.	Air Quality Analysis (Rule 62-212.400(7), F.A.C.): ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
7.	Source Impact Analysis (Rule 62-212.400(5), F.A.C.): ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
8.	Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
9.	Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable
10.	Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): ☐ Attached, Document ID: ____ ☒ Not Applicable

Additional Requirements for FESOP Applications

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

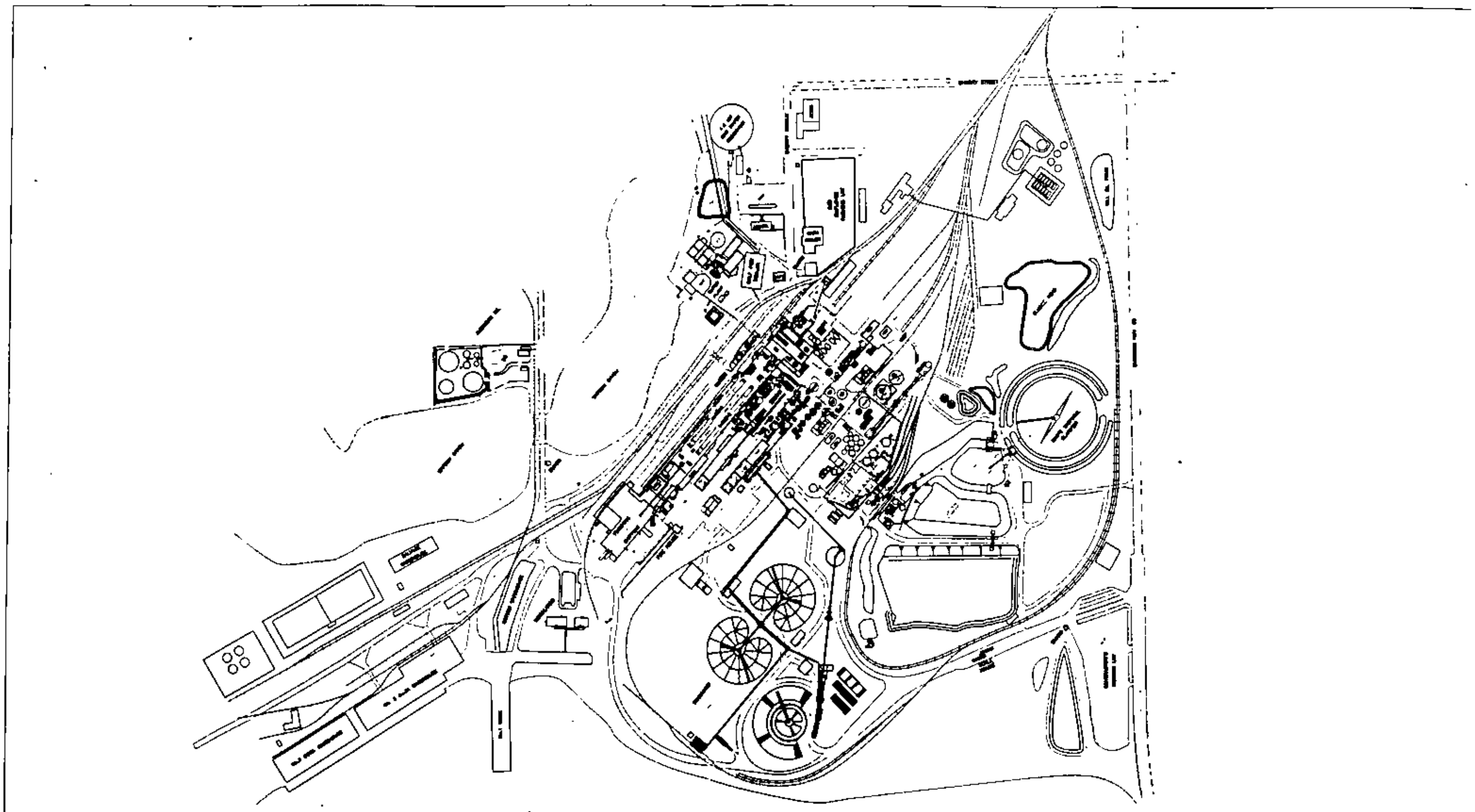
Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities (Required for initial/renewal applications only): ☐ Attached, Document ID:____ ☐ Not Applicable (revision application)	
2. Identification of Applicable Requirements (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought): ☐ Attached, Document ID:____ ☐ Not Applicable (revision application with no change in applicable requirements)	
3. Compliance Report and Plan (Required for all initial/revision/renewal applications): ☐ Attached, Document ID:____ Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.	
4. List of Equipment/Activities Regulated under Title VI (If applicable, required for initial/renewal applications only): ☐ Attached, Document ID:____ ☐ Equipment/Activities On site but Not Required to be Individually Listed ☐ Not Applicable	
5. Verification of Risk Management Plan Submission to EPA (If applicable, required for initial/renewal applications only) : ☐ Attached, Document ID:____ ☐ Not Applicable	
6. Requested Changes to Current Title V Air Operation Permit: ☐ Attached, Document ID:____ ☐ Not Applicable	

Additional Requirements Comment

ATTACHMENT SSCE-FI-C1

FACILITY PLOT PLAN



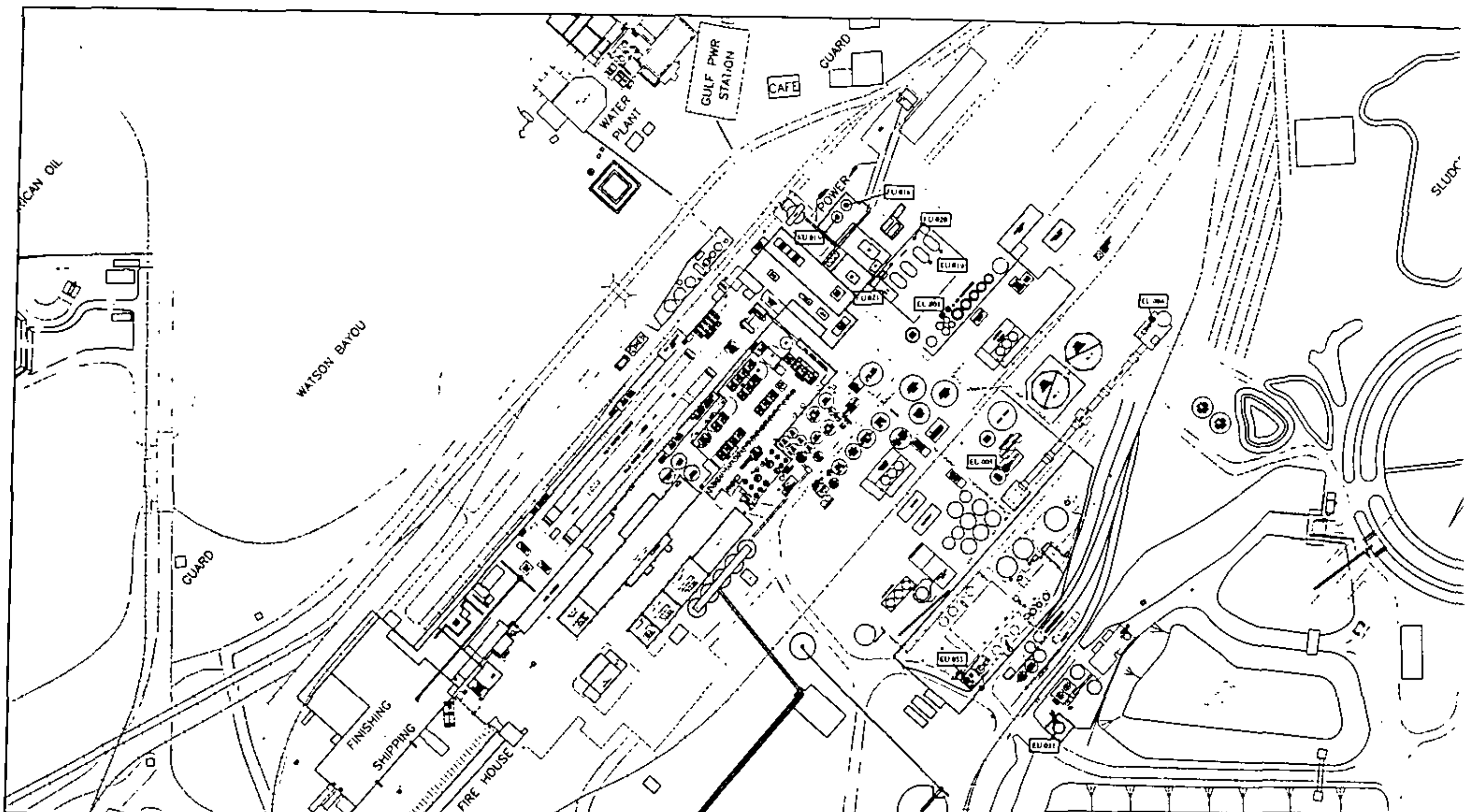
ATTACHMENT SSCE-FI-C1a. FACILITY PLOT PLAN

STONE CONTAINER ENTERPRISES, INC.
PANAMA CITY, FL

FILENAME: 0637645/4.4/App Att/SSCE-FI-C1.dwg

LATEST REVISION: 12/02/04

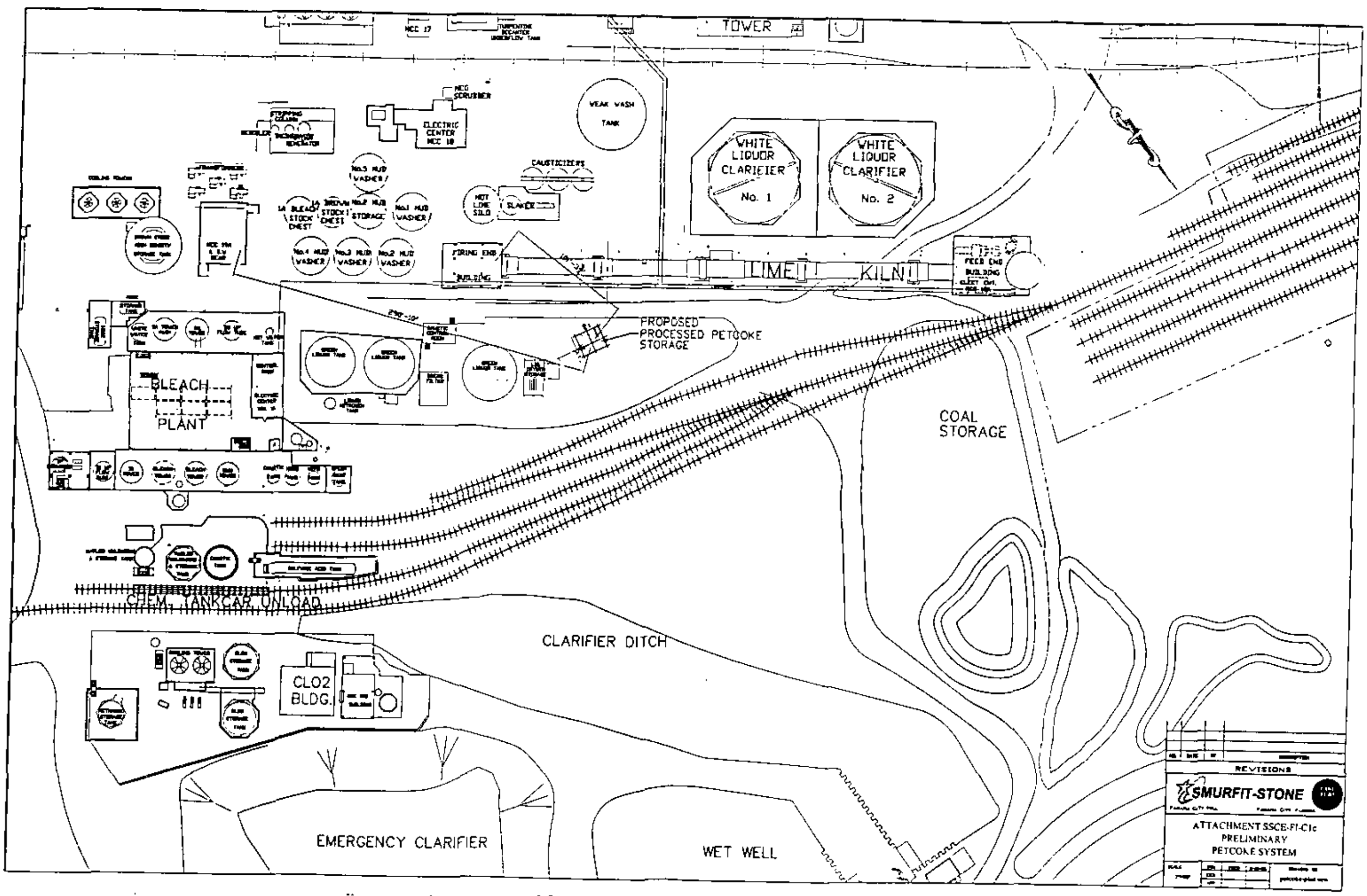
Golder Associates



ATTACHMENT SSCE-FI-C1b. FACILITY PLOT PLAN
(Enlarged to Identify Emission Points)
STONE CONTAINER ENTERPRISES, INC.
PANAMA CITY, FL

FILENAME: 0637645/4.4/App Att/SSCE-FI-C1.dwg
LATEST REVISION: 12/02/04

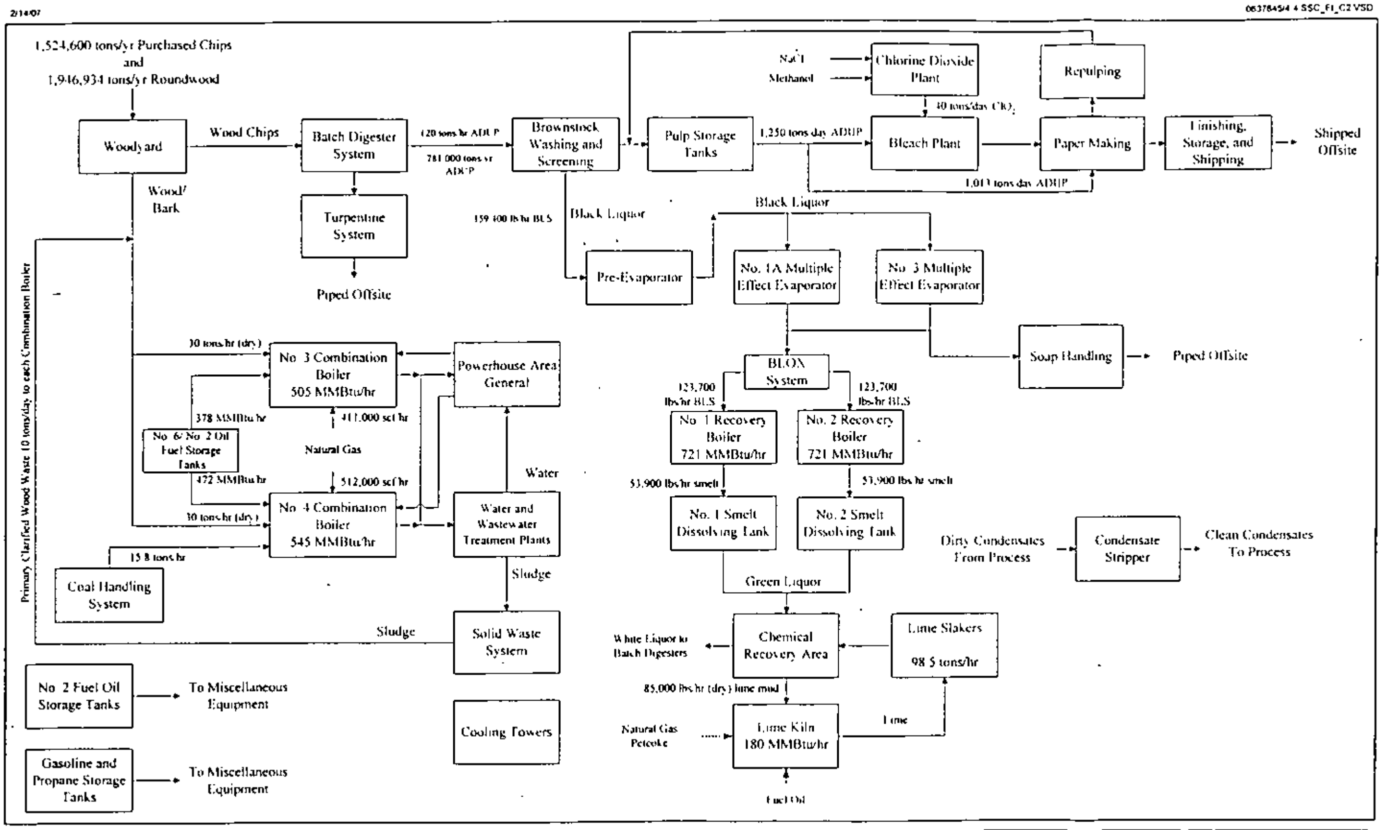
Golder Associates


TOWER
WEAK WASH TANK
ELECTRIC CENTER MCC 10
WHITE LIQUOR CLARIFIER No. 1
WHITE LIQUOR CLARIFIER No. 2
No.5 MUD WASHER
No.2 MUD STORAGE
No.1 MUD WASHER
No.4 MUD WASHER
No.3 MUD WASHER
No.2 MUD WASHER
HOT LIME SILO
SLAKER
CAUSTICIZERS
FIRING END BUILDING
LIME
KILN
FEED END BUILDING
PROPOSED PROCESSED PETCOKE STORAGE
BLEACH PLANT
COAL STORAGE
CHEM. TANKCAR UNLOAD
CLARIFIER DITCH
CLO2 BLDG.
EMERGENCY CLARIFIER
WET WELL
REVISIONS
SMURFIT-STONE
ATTACHMENT SSCE-FI-C1c
PRELIMINARY
PETCOKE SYSTEM

ATTACHMENT SSCE-FI-C2

PROCESS FLOW DIAGRAM

2/14/07 063784/4.4 SSC_FI_C2.VSD



Attachment SSC-FI-C2. Overall Plant Flow Diagram
Stone Container Corporation - Panama City, Florida

Source: Golder, 2007.

ATTACHMENT SSCE-FI-C3

PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

ATTACHMENT SSCE-FI-C3

PRECAUTIONS TO PREVENT EMISSIONS OF UNCONFINED PARTICULATE MATTER

Reasonable precautions shall be taken to prevent emissions of unconfined particulate matter. Reasonable precautions shall include, but are not limited to, the following:

1. Maintenance of roads, parking areas, and yards.
2. Application of water or other dust suppressants when necessary to control emissions.
3. Removal of particulate matter from roads and other paved areas under control of the owner or operator, and from buildings or work areas to prevent re-entrainment.
4. Stone Container Corporation will protect dust transfer points and transport and storage containers from wind action which might make dust airborne.
5. Chips manufactured on-site shall be screened following storage.
6. Chips will be screened following removal from storage prior to conveying to digesters.
7. All woodyard conveyor systems shall be covered or enclosed.
8. Drop distance from chip storage stacker shall be maintained at a minimum.
9. All main access roads shall be paved.

ATTACHMENT SSCE-FI-CC1

AREA MAP SHOWING FACILITY LOCATION

SSCE-FI-CC1 Area Map
Smurfit-Stone Container Enterprises
Panama City Mill
0637645/4.4/AppAtt/SSCE-FI-CC1
Source: Terraserver.com, 2005; Golder 2005.

Golder Associates

ATTACHMENT SSCE-FI-CC3

RULE APPLICABILITY ANALYSIS

ATTACHMENT SSCE-FI-CC3

RULE APPLICABILITY ANALYSIS

TITLE V CORE LIST (Effective: 03/01/02)

[**Note:** The Title V Core List is meant to simplify the completion of the "List of Applicable Regulations" for DEP Form No. 62-210.900(1), Application for Air Permit - Long Form. The Title V Core List is a list of rules to which all Title V Sources are presumptively subject. The Title V Core List may be referenced in its entirety, or with specific exceptions. The Department may periodically update the Title V Core List.]

Federal: ***(description)***

40 CFR 61, Subpart M: NESHAP for Asbestos.

~~40 CFR 82: Protection of Stratospheric Ozone.~~
~~40 CFR 82, Subpart B: Servicing of Motor Vehicle Air Conditioners (MVAC).~~
40 CFR 82, Subpart F: Recycling and Emissions Reduction.

State: ***(description)***

CHAPTER 62-4, F.A.C.: PERMITS (Effective 06/01/01)

62-4.030, F.A.C.: General Prohibition.
62-4.040, F.A.C.: Exemptions.
62-4.050, F.A.C.: Procedure to Obtain Permits; Application.
62-4.060, F.A.C.: Consultation.
62-4.070, F.A.C.: Standards for Issuing or Denying Permits; Issuance; Denial.
62-4.080, F.A.C.: Modification of Permit Conditions.
62-4.090, F.A.C.: Renewals.
62-4.100, F.A.C.: Suspension and Revocation.
62-4.110, F.A.C.: Financial Responsibility.
62-4.120, F.A.C.: Transfer of Permits.
62-4.130, F.A.C.: Plant Operation - Problems.
62-4.150, F.A.C.: Review.
62-4.160, F.A.C.: Permit Conditions.
62-4.210, F.A.C.: Construction Permits.
62-4.220, F.A.C.: Operation Permit for New Sources.

CHAPTER 62-210, F.A.C.: STATIONARY SOURCES - GENERAL REQUIREMENTS (Effective 06/21/01)

62-210.300, F.A.C.: Permits Required.
62-210.300(1), F.A.C.: Air Construction Permits.
62-210.300(2), F.A.C.: Air Operation Permits.
62-210.300(3), F.A.C.: Exemptions.
62-210.300(5), F.A.C.: Notification of Startup.
62-210.300(6), F.A.C.: Emissions Unit Reclassification.
62-210.300(7), F.A.C.: Transfer of Air Permits.

62-210.350, F.A.C.: Public Notice and Comment.
62-210.350(1), F.A.C.: Public Notice of Proposed Agency Action.
62-210.350(2), F.A.C.: Additional Public Notice Requirements for Emissions Units Subject to Prevention of Significant Deterioration or Nonattainment-Area Preconstruction Review.
62-210.350(3), F.A.C.: Additional Public Notice Requirements for Sources Subject to Operation Permits for Title V Sources.
62-210.360, F.A.C.: Administrative Permit Corrections.
62-210.370(3), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility.
62-210.400, F.A.C.: Emission Estimates.
62-210.650, F.A.C.: Circumvention.
62-210.700, F.A.C.: Excess Emissions.
62-210.900, F.A.C.: Forms and Instructions.
62-210.900(1), F.A.C.: Application for Air Permit – Title V Source, Form and Instructions.
62-210.900(5), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility, Form and Instructions.
62-210.900(7), F.A.C.: Application for Transfer of Air Permit – Title V and Non-Title V Source.

CHAPTER 62-212, F.A.C.: STATIONARY SOURCES - PRECONSTRUCTION REVIEW (Effective 08/17/00)

CHAPTER 62-213, F.A.C.: OPERATION PERMITS FOR MAJOR SOURCES OF AIR POLLUTION (Effective 04/16/01)

62-213.205, F.A.C.: Annual Emissions Fee.
62-213.400, F.A.C.: Permits and Permit Revisions Required.
62-213.410, F.A.C.: Changes without Permit Revision.
62-213.412, F.A.C.: Immediate Implementation Pending Revision Process.
62-213.415, F.A.C.: Trading of Emissions within a Source.
62-213.420, F.A.C.: Permit Applications.
62-213.430, F.A.C.: Permit Issuance, Renewal, and Revision.
62-213.440, F.A.C.: Permit Content.
62-213.450, F.A.C.: Permit Review by EPA and Affected States
62-213.460, F.A.C.: Permit Shield.
62-213.900, F.A.C.: Forms and Instructions.
62-213.900(1), F.A.C.: Major Air Pollution Source Annual Emissions Fee Form.
62-213.900(7), F.A.C.: Statement of Compliance Form.

CHAPTER 62-296, F.A.C.: STATIONARY SOURCES - EMISSION STANDARDS (Effective 03/02/99)

62-296.320(4)(c), F.A.C.: Unconfined Emissions of Particulate Matter.
62-296.320(2), F.A.C.: Objectionable Odor Prohibited.

CHAPTER 62-297, F.A.C.: STATIONARY SOURCES - EMISSIONS MONITORING
(Effective 03/02/99)

62-297.310, F.A.C.: General Test Requirements.
62-297.330, F.A.C.: Applicable Test Procedures.
62-297.340, F.A.C.: Frequency of Compliance Tests.
62-297.345, F.A.C.: Stack Sampling Facilities Provided by the Owner of an Emissions Unit.
62-297.350, F.A.C.: Determination of Process Variables.
62-297.570, F.A.C.: Test Report.
62-297.620, F.A.C.: Exceptions and Approval of Alternate Procedures and Requirements.

Miscellaneous:

CHAPTER 28-106, F.A.C.: Decisions Determining Substantial Interests
CHAPTER 62-110, F.A.C.: Exception to the Uniform Rules of Procedure, Effective 07-01-98
~~**CHAPTER 62-256, F.A.C.:** Open Burning and Frost Protection Fires, Effective 11-30-94~~
CHAPTER 62-257, F.A.C.: Asbestos Notification and Fee, Effective 02-09-99
CHAPTER 62-281, F.A.C.: Motor Vehicle Air Conditioning Refrigerant Recovery and Recycling, Effective 09-10-96

III. EMISSIONS UNIT INFORMATION

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

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

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

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

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

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

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

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

Emissions Unit Description and Status

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

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

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

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

2. Description of Emissions Unit Addressed in this Section:

   Lime Kiln/NCG Collection

3. Emissions Unit Identification Number: **004**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A			**26**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

    The Lime Kiln will be fueled by No. 6 fuel oil, natural gas, and up to 90 percent pulverized petcoke (10 percent No. 6 fuel oil, or natural gas, minimum). The petcoke will be brought onsite by trucks. Total reduced sulfur (TRS) and hazardous air pollutant (HAP) emissions from the Low-Volume High Concentration (LVHC) system [Batch Digester System (EU 027), the pre-evaporator, and Nos. 1A and 3 MEE Systems (EU 026)] are vented to the Lime Kiln/NCG Collection System (EU 004), or alternatively to No. 4 Combination Boiler, for destruction.

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **021 – Incineration of non-condensable gases (NCGs) in Lime Kiln** **053 – Venturi Scrubber on the Lime Kiln** **The petcoke is pneumatically conveyed from the storage silo to the Lime Kiln burner. The conveying system is enclosed.**
2. Control Device or Method Code(s): **021, 053**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **85,000 lb/hr $CaCO_3$**	
2. Maximum Production Rate: **36,700 lb/hr CaO**	
3. Maximum Heat Input Rate: **180** million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8,760** hours/year
6. Operating Capacity/Schedule Comment: **Process, production, and heat input rates are 24-hour averages. $CaCO_3$ is lime mud (dry). CaO is reburned lime (dry). Maximum production rate with 10-percent impurities is 40,370 lb/hr (dry).**	

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **Lime Kiln/NCG Collection**	2. Emission Point Type Code: **2**

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

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

Pulping System – MACT I Sources and Lime Kiln/NCG Collection

5. Discharge Type Code: **V**	6. Stack Height: **60.5** feet	7. Exit Diameter: **6.3** feet
8. Exit Temperature: **166**°F	9. Actual Volumetric Flow Rate: **92,800** acfm	10. Water Vapor: %

11. Maximum Dry Standard Flow Rate: **81,400** dscfm	12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):	14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)

15. Emission Point Comment:

Exit temperature and actual volumetric flow rate represent average of last 9 years of stack tests. Maximum dry standard flow rate is corrected to 10-percent O_2, and represents highest from last 9 years of stack tests.
See Attachment SSC-EU1-C15.

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 5

1. Segment Description (Process/Fuel Type): **Pulp and Paper and Wood Products, Sulfate (Kraft) Pulping, Lime Kiln: General**		
2. Source Classification Code (SCC): **3-07-001-06**	3. SCC Units: **Tons Air-dried Unbleached Pulp Produced**	
4. Maximum Hourly Rate: **120**	5. Maximum Annual Rate: **781,000**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Maximum annual pulp production rate based on permit limit set for PSD purposes.**		

Segment Description and Rate: Segment 2 of 5

1. Segment Description (Process/Fuel Type): **In-process Fuel Use; Residual Oil: Lime Kiln**		
2. Source Classification Code (SCC): **3-90-004-03**	3. SCC Units: **Thousands Gallons Burned**	
4. Maximum Hourly Rate: **1.20**	5. Maximum Annual Rate: **10,512**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **2.5**	8. Maximum % Ash:	9. Million Btu per SCC Unit: **150**
10. Segment Comment: **Based on maximum heat input of 180 MMBtu/hr (daily average) and 150,000 Btu/gal from No. 6 Fuel Oil.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 3 of 5

1. Segment Description (Process/Fuel Type): **In-process Fuel Use; Natural Gas: Lime Kiln**		
2. Source Classification Code (SCC): **3-90-006-03**	3. SCC Units: **Million Cubic Feet Burned**	
4. Maximum Hourly Rate: **0.180**	5. Maximum Annual Rate: **1,576.8**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit: **1,000**
10. Segment Comment: **Maximum hourly rate based on 180 MMBtu/hr (daily average) and 1,000 Btu/ft^3.**		

Segment Description and Rate: Segment 4 of 5

1. Segment Description (Process/Fuel Type): **In-process Fuel Use; Petroleum Coke: Lime Kiln**		
2. Source Classification Code (SCC): **3-90-008-99**	3. SCC Units: **Tons Petcoke Burned**	
4. Maximum Hourly Rate: **5.88**	5. Maximum Annual Rate: **51,529.4**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur: **7.0**	8. Maximum % Ash: **1.5**	9. Million Btu per SCC Unit: **30.6**
10. Segment Comment: **Maximum annual rate is based on maximum heat input of 180 MMBtu/hr and 15,300 Btu/lb heating value. Maximum percent sulfur ranges from 5 percent to 7 percent, and maximum percent ash is very low, ranging from 0 percent to 1.5 percent.**		

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 5 of 5

1. Segment Description (Process/Fuel Type): **Lime Manufacture; Calcining: Rotary Kiln**		
2. Source Classification Code (SCC): **3-05-016-04**	3. SCC Units: **Tons Lime (CaO) Produced**	
4. Maximum Hourly Rate: **18.35**	5. Maximum Annual Rate: **160,746**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		

Segment Description and Rate: Segment ____ of ____

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

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	053		EL
PM_{10}	053		NS
SO_2	053		EL
SAM	053		NS
NO_x			NS
CO			NS
VOC			NS
TRS	021		EL
HAPs	021		NS
PB			NS
H114 – Mercury			NS
Acetaldehyde – H001			NS
Methanol – H115			NS
Xylenes – H186			NS

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **29.83** lb/hour **130.7** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **Permit Limit** Reference: **Permit No. 0050009-025-AV**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **29.83 lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 130.7 TPY**	
11. Potential Fugitive and Actual Emissions Comment: **Emission limit of 29.83 lb/hr and 130.7 TPY specified in Permit No. 0050009-025-AV.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 2

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **E = 17.31 $P^{0.16}$ lb/hr**	4. Equivalent Allowable Emissions: **29.83** lb/hour **130.7** tons/year
5. Method of Compliance: **Annual stack testing using EPA Method 5.**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on process weight table: 62-296.320(4)(a)2. Emissions capped at 29.83 lb/hr by Permit No. 0050009-025-AV.**	

Allowable Emissions Allowable Emissions 2 of 2

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **0.064 grains/dscf at 10 percent O_2**	4. Equivalent Allowable Emissions: **44.7** lb/hour **195.6** tons/year
5. Method of Compliance: **Annual test using EPA Test Method 5.**	
6. Allowable Emissions Comment (Description of Operating Method): **40 CFR 63.862(a)(1)(i)(c). 0.064 grains/dscf x 81,400 dscfm x 60 min/hr x 1 lb/7,000 grains = 44.7 lb/hr**	

Allowable Emissions Allowable Emissions _____ of _____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **25.27** lb/hour **110.7** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **PM_{10} is 84.7 percent of PM** Reference: **NCASI Emission Factor**	7. Emissions Method Code: **5**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly: 29.83 lb/hr PM x 0.847 lb PM_{10}/lb PM = 25.27 lb/hr

Annual: 25.27 lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 110.7 TPY

11. Potential Fugitive and Actual Emissions Comment:

Emission factor is 84.7 percent of PM, obtained from NCASI "Particulate Emission Data for Pulp and Paper Industry-Specific Sources" (August 25, 2006)

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **TRS**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **8.6** lb/hour **37.7** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **20 ppmvd at 10 percent O_2 (12-hr average)** Reference: **Rule 62-296.404(3)(e)1**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly:

20 ft^3/10^6 ft^3 TRS x 81,400 dscf/min x 2116.8 lb/ft^2 x lb-mole-°R/1,545.6 ft-lb$_f$ x 1/528°R x 34 lb/lb-mol x 60 min/hr = 8.6 lb/hr

Annual:

8.6 lb/hr TRS x 8,760 hr/yr x 1 ton/2,000 lb = 37.7 TPY

11. Potential Fugitive and Actual Emissions Comment:

Emission limit of 20 ppmvd at 10 percent O_2 (12-hr average) specified in Permit No. 0050009-025-AV.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **RULE**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **20 ppmvd at 10 percent O_2 (12-hr average)**	4. Equivalent Allowable Emissions: 8.6 lb/hour 37.7 tons/year
5. Method of Compliance: **Annual source test using EPA Method 16, or 16A.**	
6. Allowable Emissions Comment (Description of Operating Method): **62-296.404(3)(e)1, F.A.C. and Permit No. 0050009-025-AV.**	

Allowable Emissions Allowable Emissions _____ of _____

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

Allowable Emissions Allowable Emissions _____ of _____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **32.9** lb/hour **144.3** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **7 percent maximum Sulfur content in petcoke** Reference: **Supplier guarantee**	7. Emissions Method Code: **3**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly:

0.07 lb S/lb petcoke x 2 lb SO_2/lb S x 1 lb petcoke/15,300 Btu x 10^6 Btu/MMBtu x 180 MMBtu/hr x (1 - 0.9) x (1 – 0.8) = 32.9 lb/hr

Annual:

32.9 lb/hr SO_2 x 8,760 hr/yr x 1 ton/2,000 lb = 144.3 TPY

11. Potential Fugitive and Actual Emissions Comment:

The Lime Kiln has an 80 percent inherent SO_2 removal efficiency, and the scrubber has a 90 percent SO_2 removal efficiency. The petroleum coke has a maximum 7 percent sulfur content and all calculations assume burning 100 percent petcoke.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

<u>Allowable Emissions</u> Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **32.9 lb/hr**	4. Equivalent Allowable Emissions: **32.9** lb/hour **144.3** tons/year
5. Method of Compliance: **EPA Method 8**	
6. Allowable Emissions Comment (Description of Operating Method):	

<u>Allowable Emissions</u> Allowable Emissions ____ of ____

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

<u>Allowable Emissions</u> Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **SAM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.75** lb/hour **7.64** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0951 lb/ton CaO** Reference: **See PSD Report (Table 2-3)**	7. Emissions Method Code: **5**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly: 0.0951 lb SAM/ton CaO x 18.35 ton/hr CaO = 1.75 lb/hr

Annual: 1.75 lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 7.64 TPY

11. Potential Fugitive and Actual Emissions Comment:

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **NO_x**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **107.8** lb/hour **472.2** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **185 ppm at 10 percent O_2** Reference: **Quote by COEN (11/18/06)**	7. Emissions Method Code: **5**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly:
185 $ft^3/10^6\ ft^3$ NO_x x 81,400 dscf/min x 2116.8 lb/ft^2 x lb-mole-°R/1,545.6 ft-lb_f x 1/528°R x 46 lb/lb-mol x 60 min/hr = 107.8 lb/hr

Annual:
107.8 lb/hr NO_x x 8,760 hr/yr x 1 ton/2,000 lb = 472.2 TPY

11. Potential Fugitive and Actual Emissions Comment:

Potential emissions based on a quote by COEN (November 18, 2006) that estimated NO_x at 165 - 185 ppm at 10 percent O_2 for a mixture of 80 percent petcoke and 20 percent No. 6 Fuel Oil.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **185 ppm at 10 percent O_2**	4. Equivalent Allowable Emissions: **107.8** lb/hour **472.2** tons/year
5. Method of Compliance: **EPA Method 7E**	
6. Allowable Emissions Comment (Description of Operating Method):	

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **CO**

2. Total Percent Efficiency of Control:

3. Potential Emissions: **3.32** lb/hour **14.5** tons/year

4. Synthetically Limited? ☐ Yes ☒ No

5. Range of Estimated Fugitive Emissions (as applicable): to tons/year

6. Emission Factor: **0.181 lb/ton CaO**

Reference: **NCASI Technical Bulletin No. 884**

7. Emissions Method Code: **2**

8.a. Baseline Actual Emissions (if required): tons/year

8.b. Baseline 24-month Period: From: To:

9.a. Projected Actual Emissions (if required): tons/year

9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly: 0.181 lb/ton CaO x 18.35 ton/hr CaO = 3.32 lb/hr
Annual: 3.32 lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 14.5 TPY

11. Potential Fugitive and Actual Emissions Comment:

NCASI Technical Bulletin No. 884, Table 4.13, mean value.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **VOC**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.84** lb/hour **3.70** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.046 lb/ton CaO** Reference: **NCASI Technical Bulletin No. 884**	7. Emissions Method Code: **2**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **Hourly: 0.046 lb/ton CaO x 18.35 ton/hr CaO = 0.84 lb/hr** **Annual: 0.84 lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 3.70 TPY**	
11. Potential Fugitive and Actual Emissions Comment: **NCASI Technical Bulletin No. 884, Table 4.13, mean value.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **Pb**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.059** lb/hour **0.257** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.0032 lb/ton CaO** Reference: **NCASI Technical Bulletin No. 858**	7. Emissions Method Code: **5**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **Hourly: 0.0032 lb/ton CaO x 18.35 ton CaO/hr = 0.059 lb/hr** **Annual: 0.059 lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 0.257 TPY**	
11. Potential Fugitive and Actual Emissions Comment: **NCASI Technical Bulletin No. 858, Table 16C, mean value.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **H114 - Mercury**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.14×10^{-5}** lb/hour **4.98×10^{-5}** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **6.2×10^{-7} lb/ton CaO** Reference: **NCASI Technical Bulletin No. 858**	7. Emissions Method Code: **5**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly: 6.2×10^{-7} lb/ton CaO x 18.35 ton CaO/hr = 1.14×10^{-5} lb/hr
Annual: 1.1×10^{-5} lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 4.98×10^{-5} TPY

11. Potential Fugitive and Actual Emissions Comment:

NCASI Technical Bulletin No. 858, Table 16C, mean value.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **HAPs**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1.5** lb/hour **6.4** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **8.0x10^{-2} lb/ton CaO** Reference: **NCASI Technical Bulletin**	7. Emissions Method Code: **5**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly: 8.0x10^{-2} lb/ton CaO x 18.35 ton CaO/hr = 1.5 lb/hr
Annual: 1.5x10^{-5} lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 6.4 TPY

11. Potential Fugitive and Actual Emissions Comment:

Emission factor based on median values of Lime Kilns firing only fuel oil or petcoke. Non-detects are zero.

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: ☒ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Annual testing using EPA Method 9, upon request.**	
5. Visible Emissions Comment: **Due to moisture interference, the visible emission limiting standard pursuant to Rule 62-296.320(4), F.A.C. is not applicable and is deferred to Rule 62-296.404(2)(b), F.A.C.**	

Visible Emissions Limitation: Visible Emissions Limitation ____ of ____

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

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 1 of 4

1. Parameter Code: **EM**	2. Pollutant(s): **TRS**
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **Lear-Seigler** Model Number: **ML 8950**	Serial Number: **78**
5. Installation Date: **20 Nov 1992**	6. Performance Specification Test Date: **29 Apr 1993**
7. Continuous Monitor Comment: **62-296.404(5)(a) and (b).**	

Continuous Monitoring System: Continuous Monitor 2 of 4

1. Parameter Code: **O_2**	2. Pollutant(s):
3. CMS Requirement:	☒ Rule ☐ Other
4. Monitor Information... Manufacturer: **Lear-Seigler** Model Number: **ML 8950**	Serial Number: **78**
5. Installation Date: **20 Nov 1992**	6. Performance Specification Test Date: **29 Apr 1993**
7. Continuous Monitor Comment: **62-296.404(5)(b)1.a.**	

II. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor 3 of 4

1. Parameter Code: **PRS**	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☒ Other
4. Monitor Information... Manufacturer: **Lear-Seigler** Model Number: **P/N 80280366-1**	Serial Number: **54007-1**
5. Installation Date: **01 Oct 1994**	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **Permit No. 0050009-025-AV and 40 CFR 63.864(e)(10) require measurement of pressure differential across wet scrubber. PRS represents pressure drop.**	

Continuous Monitoring System: Continuous Monitor 4 of 4

1. Parameter Code: **FLOW**	2. Pollutant(s):
3. CMS Requirement:	☐ Rule ☒ Other
4. Monitor Information... Manufacturer: **Yokogawa** Model Number: **AM11-DHA1A**	Serial Number:
5. Installation Date: **2002**	6. Performance Specification Test Date:
7. Continuous Monitor Comment: **Two meters. Permit No. 0050009-025-AV and 40 CFR 63.864(e)(10) require measurement of scrubber water flow rate to the bull nozzle and for the tangential flow.**	

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **SSCE-EU1-I1** ☐ Previously Submitted, Date ____
2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **SSCE-EU1-I2** ☐ Previously Submitted, Date ____
3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☒ Attached, Document ID: **SSCE-EU1-I3** ☐ Previously Submitted, Date ____
4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date ____ ☒ Not Applicable (construction application)
5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date ____ ☒ Not Applicable
6. Compliance Demonstration Reports/Records ☐ Attached, Document ID: ____ Test Date(s)/Pollutant(s) Tested: ____ ☐ Previously Submitted, Date: ____ Test Date(s)/Pollutant(s) Tested: ____ ☐ To be Submitted, Date (if known): ____ Test Date(s)/Pollutant(s) Tested: ____ ☒ Not Applicable Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable

Additional Requirements for Air Construction Permit Applications

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

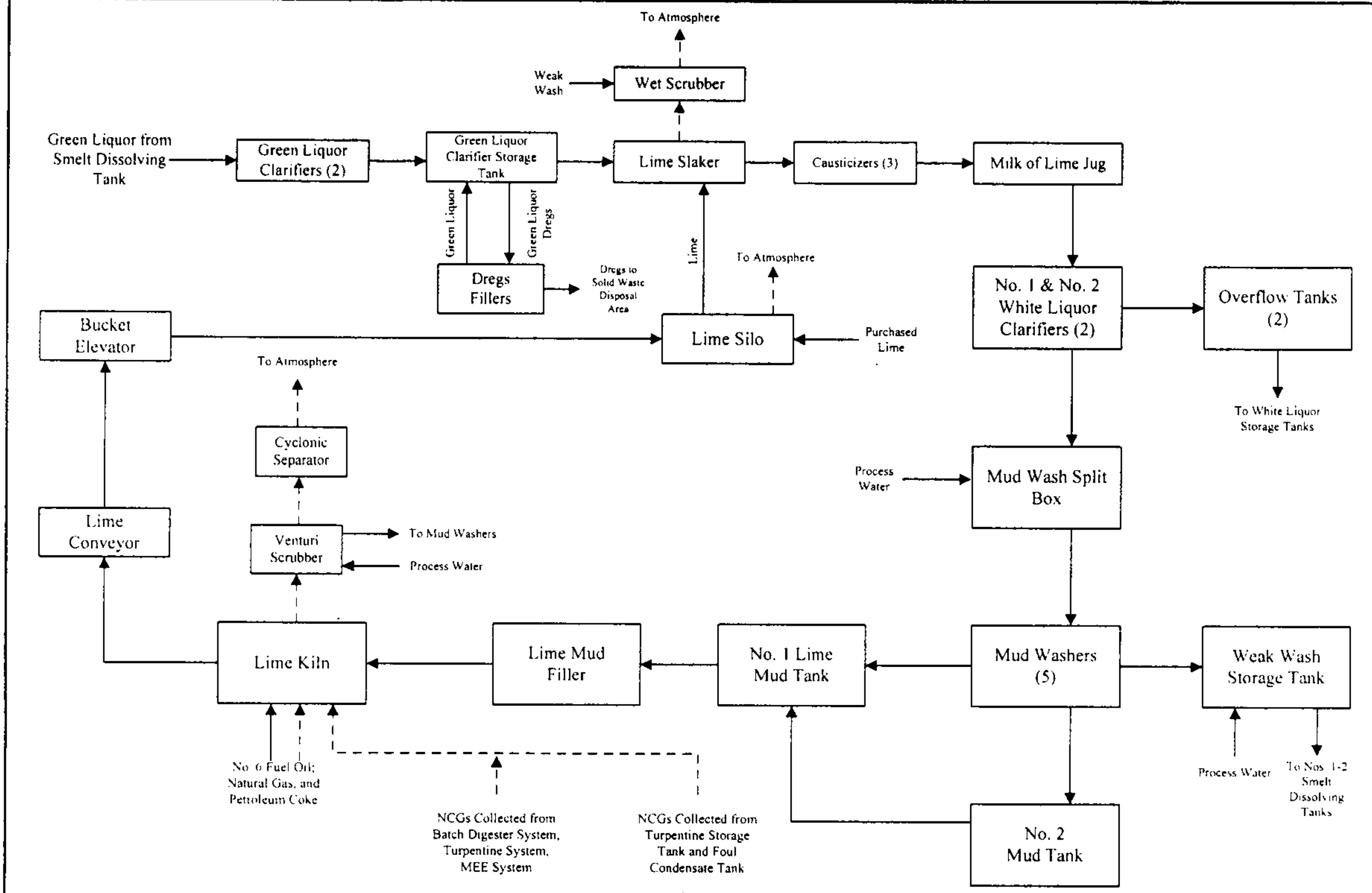
Additional Requirements for Title V Air Operation Permit Applications

1. Identification of Applicable Requirements
   ☐ Attached, Document ID: ____ ☐ Not Applicable
2. Compliance Assurance Monitoring
   ☐ Attached, Document ID: ____ ☐ Not Applicable
3. Alternative Methods of Operation
   ☐ Attached, Document ID: ____ ☐ Not Applicable
4. Alternative Modes of Operation (Emissions Trading)
   ☐ Attached, Document ID: ____ ☐ Not Applicable
5. Acid Rain Part Application
   - ☐ Certificate of Representation (EPA Form No. 7610-1)
     - ☐ Copy Attached, Document ID: ____
   - ☐ Acid Rain Part (Form No. 62-210.900(1)(a))
     - ☐ Attached, Document ID: ____
     - ☐ Previously Submitted, Date: ____
   - ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
     - ☐ Attached, Document ID: ____
     - ☐ Previously Submitted, Date: ____
   - ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.)
     - ☐ Attached, Document ID: ____
     - ☐ Previously Submitted, Date: ____
   - ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
     - ☐ Attached, Document ID: ____
     - ☐ Previously Submitted, Date: ____
   - ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
     - ☐ Attached, Document ID: ____
     - ☐ Previously Submitted, Date: ____
   - ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
     - ☐ Attached, Document ID: ____
     - ☐ Previously Submitted, Date: ____
   - ☐ Not Applicable

Additional Requirements Comment

ATTACHMENT SSCE-EU1-I1

PROCESS FLOW DIAGRAM



Attachment SSCE-EU1-I1
Process Flow Diagram — Lime Kiln
Smurfit-Stone Container Enterprises, Inc.
Panama City, Florida

Process Flow Legend

Solid/Liquid Flow ⟶

Gas Flow - - - ->

Golder Associates

ATTACHMENT SSCE-EU1-I2

FUEL ANALYSIS OR SPECIFICATION

ATTACHMENT SSCE-EU1-I2

FUEL ANALYSIS
LIME KILN

Fuel	Density (lb/gal)	Weight % Sulfur	Weight % Nitrogen	Weight % Ash	Heat Capacity
No. 6 Fuel Oil	8.33	2.5	0.08	0.067	145,000 – 150,000 Btu/gal 18,500 Btu/lb
Natural Gas	--	0.1	--	--	1,000 Btu/scf
Petroleum Coke	--	5 - 7	1.3 – 1.9	0 – 1.5	15,300 Btu/lb

Note: scf = standard cubic foot.

ATTACHMENT SSCE-EU1-I3

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

ATTACHMENT SSCE-EU1-I3

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

CONTROL EQUIPMENT PARAMETERS[a]

LIME KILN SCRUBBER (VENTURI)

Manufacturer	Chemico	
Model No.	1843	
Date of Installation	1970	
Inlet Gas Temp	420-600	°F
Inlet Gas Flow Rate (Maximum)	204,000	acfm
Outlet Gas Temp	160-170	°F
Pressure Drop Across Device (Minimum)[c]	18	in. H_2O
Scrubber Media	Water	
Scrubber Liquor Flow Rate (Minimum)[c]		
Bull Nozzle	455	gpm
Tangential Flow	493	gpm
Control Efficiency – Particulate Matter[b]	+90	%
Maximum Permitted Particulate Emission Rate[c]	29.83	lb(PM)/hr

[a] Control Equipment Parameters may vary according to process conditions.
[b] Based on manufacturer's quote.
[c] Values obtained from Permit 0050009-025-AV.

III. EMISSIONS UNIT INFORMATION

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

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

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

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

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

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

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

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

Emissions Unit Description and Status

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

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

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

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

2. Description of Emissions Unit Addressed in this Section:

   Petroleum Coke (petcoke) storage silo

3. Emissions Unit Identification Number:

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
C			**26**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

    A 250-ton storage silo will be constructed to receive ground petcoke deliveries by truck. The petcoke will be transferred pneumatically from the truck to the storage silo. Petcoke will also be transferred pneumatically from the storage silo to the Lime Kiln (EU 004) as a primary fuel. A baghouse will be installed on top of the storage silo to collect dust from the silo loading, and unloading system.

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description: **127 – Baghouse on the petcoke storage silo**
2. Control Device or Method Code(s): **127**

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **50 tons/hr petcoke**	
2. Maximum Production Rate: **51,529 tons/yr**	
3. Maximum Heat Input Rate: million Btu/hr	
4. Maximum Incineration Rate: pounds/hr tons/day	
5. Requested Maximum Operating Schedule: **24** hours/day **52** weeks/year	 **7** days/week **8,760** hours/year
6. Operating Capacity/Schedule Comment: **Maximum Process or Throughput Rate refers to maximum truck deliveries of petcoke of two trucks per hour, with each truck carrying 25 tons of petcoke. Maximum production rate refers to maximum annual use of petcoke in Lime Kiln.**	

C. EMISSION POINT (STACK/VENT) INFORMATION
(Optional for unregulated emissions units.)

Emission Point Description and Type

1. Identification of Point on Plot Plan or Flow Diagram: **Proposed Processed Petcoke Storage**		2. Emission Point Type Code: **1**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **H**	6. Stack Height: **123** feet	7. Exit Diameter: **1** feet
8. Exit Temperature: **80**°F	9. Actual Volumetric Flow Rate: **2,000** acfm	10. Water Vapor: %
11. Maximum Dry Standard Flow Rate: dscfm		12. Nonstack Emission Point Height: feet
13. Emission Point UTM Coordinates... Zone: East (km): North (km):		14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)
15. Emission Point Comment:		

EMISSIONS UNIT INFORMATION
Section [2]
Petcoke Storage Silo

D. SEGMENT (PROCESS/FUEL) INFORMATION

Segment Description and Rate: Segment 1 of 1

1. Segment Description (Process/Fuel Type): **Industrial Processes; Mineral Products; Bulk Materials Storage Bins; Coke**		
2. Source Classification Code (SCC): **3-05-102-04**	3. SCC Units: **Tons Petcoke Stored**	
4. Maximum Hourly Rate: **50**	5. Maximum Annual Rate: **51,529.4**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Maximum annual rate is based on maximum heat input of 180 MMBtu/hr and 15,300 Btu/lb to the Lime Kiln (EU 004). Maximum hourly rate is based on two truck deliveries per hour, with each truck carrying 25 tons.**		

Segment Description and Rate: Segment ____ of ____

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

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	127		NS
PM_{10}	127		NS

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **PM**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.14** lb/hour **0.60** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **0.008 grains/ft³** Reference: **Vendor supplied grain loading**	7. Emissions Method Code: **5**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years

10. Calculation of Emissions:

Hourly: 2,000 ft³/min x 0.008 grains/ft³ x 1 lb/7,000 grains x 60 min/hr = 0.14 lb/hr

Annual: 0.14 lb/hr x 8,760 hr/yr x 1 ton/2,000 lb = 0.60 TPY

11. Potential Fugitive and Actual Emissions Comment:

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **PM_{10}**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **0.14** lb/hour **0.60** tons/year	4. Synthetically Limited? ☐ Yes ☒ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **PM_{10} is 100 percent of PM** Reference: **AP-42, Table 10.2-4**	7. Emissions Method Code: **3**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions:	
11. Potential Fugitive and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

Allowable Emissions Allowable Emissions ____ of ____

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

G. VISIBLE EMISSIONS INFORMATION

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

Visible Emissions Limitation: Visible Emissions Limitation 1 of 1

1. Visible Emissions Subtype: **VE20**	2. Basis for Allowable Opacity: ☒ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance: **Annual testing using EPA Method 9, upon request.**	
5. Visible Emissions Comment: **Due to moisture interference, the visible emission limiting standard pursuant to Rule 62-296.320(4), F.A.C. is not applicable and is deferred to Rule 62-296.404(2)(b), F.A.C.**	

Visible Emissions Limitation: Visible Emissions Limitation ____ of ____

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

H. CONTINUOUS MONITOR INFORMATION

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

Continuous Monitoring System: Continuous Monitor ____ of ____

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

Continuous Monitoring System: Continuous Monitor ____ of ____

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

I. EMISSIONS UNIT ADDITIONAL INFORMATION

Additional Requirements for All Applications, Except as Otherwise Stated

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **SSCE-EU2-I1** ☐ Previously Submitted, Date ____
2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date ____
3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☒ Attached, Document ID: **SSCE-EU2-I3** ☐ Previously Submitted, Date ____
4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date ____
   ☒ Not Applicable (construction application)
5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought)
   ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date ____
   ☒ Not Applicable
6. Compliance Demonstration Reports/Records
   ☐ Attached, Document ID: ____
   Test Date(s)/Pollutant(s) Tested: ____

   ☐ Previously Submitted, Date: ____
   Test Date(s)/Pollutant(s) Tested: ____

   ☐ To be Submitted, Date (if known): ____
   Test Date(s)/Pollutant(s) Tested: ____

   ☒ Not Applicable

   Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute
   ☒ Attached, Document ID: **PSD Report** ☐ Not Applicable

Additional Requirements for Air Construction Permit Applications

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

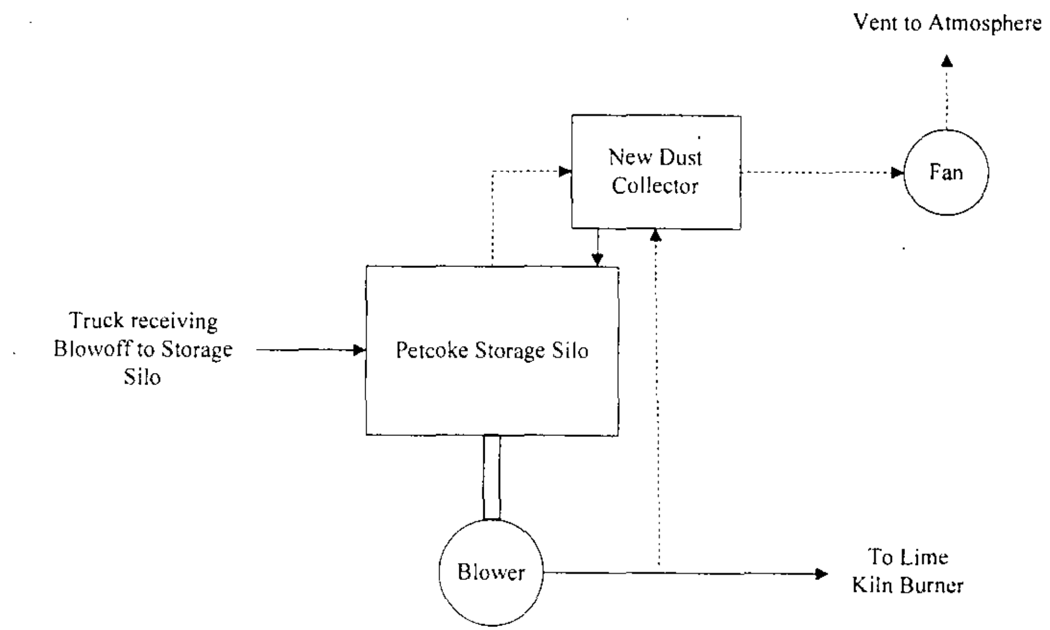
Additional Requirements for Title V Air Operation Permit Applications

1.	Identification of Applicable Requirements ☐ Attached, Document ID: ____ ☐ Not Applicable
2.	Compliance Assurance Monitoring ☐ Attached, Document ID: ____ ☐ Not Applicable
3.	Alternative Methods of Operation ☐ Attached, Document ID: ____ ☐ Not Applicable
4.	Alternative Modes of Operation (Emissions Trading) ☐ Attached, Document ID: ____ ☐ Not Applicable
5.	Acid Rain Part Application ☐ Certificate of Representation (EPA Form No. 7610-1) ☐ Copy Attached, Document ID: ____ ☐ Acid Rain Part (Form No. 62-210.900(1)(a)) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ New Unit Exemption (Form No. 62-210.900(1)(a)2.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) ☐ Attached, Document ID: ____ ☐ Previously Submitted, Date: ____ ☐ Not Applicable

Additional Requirements Comment

ATTACHMENT SSCE-EU2-I1

PROCESS FLOW DIAGRAM



Attachment SSCE-EU2-I1
Petcoke Handling System
Process Flow Diagram
Smurfit-Stone Container Enterprises
Panama City, Florida

Process Flow Legend
Solid/Liquid
Gas
Steam

Filename: 0637645/4.4/SSCE-EU2-I1.VSD
Date: 02/19/07

Golder Associates

ATTACHMENT SSCE-EU2-I3

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

ATTACHMENT SSCE-EU2-I3

DETAILED DESCRIPTION OF CONTROL EQUIPMENT

CONTROL EQUIPMENT PARAMETERS[a]

STORAGE SILO BAGHOUSE

Manufacturer	Not Selected	
Model No.	Not Selected	
Outlet Gas Temp	80	°F
Outlet Gas Flow Rate	2,000	acfm
Exhaust Gas Moisture Content	5	%
Outlet Gas Flow Rate	1858	scfm
Cleaning Method	Pulsed Jet	
No. of bags	To Be Determined	
Bag Material	To Be Determined	
Total Area of Filter Media	To Be Determined	ft^2
Air to Cloth Ratio	To Be Determined	
Manufacturer's Guaranteed Outlet Loading[b]	0.02	grains/acf
Pollutants	Outlet Loading	
Particulate Matter (PM)	0.34	lb/hr

[a] Control Equipment Parameters may vary according to process conditions.
[b] Based on manufacturer's data.

III. EMISSIONS UNIT INFORMATION

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

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

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

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

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

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

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

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

Emissions Unit Description and Status

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

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

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

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

2. Description of Emissions Unit Addressed in this Section:

   No. 3 Combination Boiler

3. Emissions Unit Identification Number: **015**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A			**26**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

    The Condensate Stripper System vents stripper off-gases (SOG) to the No. 3 Combination Boiler or the No. 4 Combination Boiler as a TRS/HAP control device.

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	053		EL
PM_{10}	053		NS
SO_2	053		EL
NO_X			NS
CO			NS
VOC			NS
TRS	021		EL
Pb – Lead			NS
HAPs	021		NS
H095 – Formaldehyde			NS
H106 – Hydrochloric Acid			EL
H114 – Mercury			EL

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: SO_2	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1,592.4** lb/hour **3,885.1** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **887.0 lb/hr, 24-hr average** Reference: **Permit No. 0050009-023-AC**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **SO_2 emissions controlled through caustic addition and SO_2 monitor. Maximum hourly based on maximum fuel oil plus wood/bark and combusting SOGs. Proposed cap over Nos. 3 and 4 Combination Boilers is 1,350 lb/hr for case of one wall enclosure on Recovery Boilers building, and 1,100 lb/hr for case of total enclosure.**	
11. Potential Fugitive and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 3

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **887 lb/hr, 24-hr average**	4. Equivalent Allowable Emissions: **887** lb/hour **3,885.1** tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0050009-023-AC.**	

Allowable Emissions Allowable Emissions 2 of 3

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1,350 lb/hr, 24-hr average**	4. Equivalent Allowable Emissions: **1,350** lb/hour tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Represents Case 1 SO_2 cap for Nos. 3 and 4 Combination Boilers.**	

Allowable Emissions Allowable Emissions 3 of 3

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1,100 lb/hr, 24-hr average**	4. Equivalent Allowable Emissions: **1,100** lb/hour tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Represents Case 2 SO_2 cap for Nos. 3 and 4 Combination Boilers.**	

III. EMISSIONS UNIT INFORMATION

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

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

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

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

A. GENERAL EMISSIONS UNIT INFORMATION

Title V Air Operation Permit Emissions Unit Classification

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

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

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

Emissions Unit Description and Status

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

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

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

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

2. Description of Emissions Unit Addressed in this Section:

   No. 3 Combination Boiler

3. Emissions Unit Identification Number: **015**

4. Emissions Unit Status Code:	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code:	8. Acid Rain Unit?
A			**26**	☐ Yes ☒ No

9. Package Unit:
   Manufacturer: Model Number:

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

    The Condensate Stripper System vents stripper off-gases (SOG) to the No. 3 Combination Boiler or the No. 4 Combination Boiler as a TRS/HAP control device. The EU ID No. for the Condensate Stripper is also EU 015.

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	053		EL
PM_{10}	053		NS
SO_2	053		EL
NO_X			NS
CO			NS
VOC			NS
TRS	021		EL
Pb – Lead			NS
HAPs	021		NS
H095 – Formaldehyde			NS
H106 – Hydrochloric Acid			EL
H114 – Mercury			EL

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

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive Emissions

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

1. Pollutant Emitted: **SO_2**	2. Total Percent Efficiency of Control:
3. Potential Emissions: **1,183.0** lb/hour **3,022.2** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **1,183 lb/hr** Reference: **Permit No. 0050009-024-AC**	7. Emissions Method Code: **0**
8.a. Baseline Actual Emissions (if required): tons/year	8.b. Baseline 24-month Period: From: To:
9.a. Projected Actual Emissions (if required): tons/year	9.b. Projected Monitoring Period: ☐ 5 years ☐ 10 years
10. Calculation of Emissions: **Maximum hourly based on combusting NCGs but not SOGs, or when combusting NCGs and SOGs. Maximum 24-hour SO_2 limit based on proposed BART limit of 690 lb/hr. Proposed cap over Nos. 3 and 4 Combination Boilers is 1,350 lb/hr for case of one wall enclosure on Recovery Boilers building, and 1,100 lb/hr for case of total enclosure.**	
11. Potential Fugitive and Actual Emissions Comment:	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 1 of 6

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **772 lb/hr, 24-hr average**	4. Equivalent Allowable Emissions: **772** lb/hour tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0050009-023-AC when not combusting NCGs or SOGs.**	

Allowable Emissions Allowable Emissions 2 of 6

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1,174.0 lb/hr**	4. Equivalent Allowable Emissions: **1,174.0** lb/hour **5,142.12** tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0050009-024-AC when combusting SOGs but not NCGs.**	

Allowable Emissions Allowable Emissions 3 of 6

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1,183.0 lb/hr**	4. Equivalent Allowable Emissions: **1,183.0** lb/hour **5,181.54** tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on Permit No. 0050009-024-AC when combusting NCGs but not SOGs, or when combusting NCGs and SOGs.**	

F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION - ALLOWABLE EMISSIONS

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

Allowable Emissions Allowable Emissions 4 of 6

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **690 lb/hr, 24-hr average**	4. Equivalent Allowable Emissions: **690** lb/hour **3,022.2** tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Based on proposed BART limit.**	

Allowable Emissions Allowable Emissions 5 of 6

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1,350 lb/hr, 24-hr average**	4. Equivalent Allowable Emissions: **1,350** lb/hour tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Represents Case 1 SO_2 cap for Nos. 3 and 4 Combination Boilers**	

Allowable Emissions Allowable Emissions 6 of 6

1. Basis for Allowable Emissions Code: **OTHER**	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: **1,100 lb/hr, 24-hr average**	4. Equivalent Allowable Emissions: **1,100** lb/hour tons/year
5. Method of Compliance: **SO_2 CEMS**	
6. Allowable Emissions Comment (Description of Operating Method): **Represents Case 2 SO_2 cap for Nos. 3 and 4 Combination Boilers.**	

PSD REPORT

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1.0 INTRODUCTION

Smurfit-Stone Container Enterprises, Inc. (SSCE) is proposing to add petroleum coke (petcoke) as an allowable fuel for the Lime Kiln [Emission Unit (EU) 004] at its Kraft and Bleached pulp and paper mill located in Panama City, Bay County, Florida (Mill). The Mill consists of the following major plant areas: chipyard, digester system, brown stock washing system, bleaching system, chemical recovery area, paper drying/converting/warehousing, and power/utilities area. The Mill is currently operating under Title V Permit No. 0050009-025-AV, issued November 8, 2006.

SSCE currently operates the Lime Kiln to calcine washed and filtered lime mud ($CaCO_3$) and regenerate calcium oxide (CaO). CaO is used in the chemical recovery process to react with green liquor to form white liquor (the cooking liquor for the pulp digesters). After CaO is regenerated in the Lime Kiln, it is stored in a silo until it is needed to react with green liquor.

The Lime Kiln is currently permitted to burn No. 6 fuel oil and natural gas as fuels. SSCE is requesting to modify the Lime Kiln to burn up to 90 percent petcoke as a substitute to No. 6 fuel oil and natural gas, as well as installation of a new burner in the Lime Kiln in order to allow firing the petcoke/oil/gas. Fuel oil will continue to be fired in the Lime Kiln, in combination with petcoke. Petcoke is a low ash (0-1.5 percent), high heating value, albeit higher sulfur (S) fuel (5 to 7 percent S), that is well suited for Lime Kiln applications. Petcoke handling and storage facilities will be installed to support the firing of this fuel in the Lime Kiln, along with a baghouse serving the petcoke storage silo.

The changes required to implement this project include:

- Installation of a new burner with primary air fan capable of firing petcoke/oil/gas with 180 million British thermal units per hour (MMBtu/hr) capacity, up to 90 percent as petcoke;
- Installation of a ground petcoke storage silo with a capacity of 250 tons, controlled by a baghouse;
- Installation of a dense phase pneumatic conveying system that will be used to unload the delivery trucks and transport the ground petcoke to the storage silo; and
- Installation of a weigh feeder and blower with eductor to pneumatically convey the ground petcoke to the Kiln burner.

Based on the comparison of past actual (baseline actual) annual emissions to future actual annual emissions from all affected sources associated with the Lime Kiln project, emission increases of sulfur dioxide (SO_2) and nitrogen oxides (NO_x) will trigger new source review (NSR) under the Federal and State prevention of significant deterioration (PSD) regulations.

For each pollutant subject to PSD review, the following analyses are required:

1. Ambient monitoring analysis, unless the net increase in emissions due to the modification causes impacts that are below specified significant impact levels;
2. Application of best available control technology (BACT) for each new or modified emissions unit, for each pollutant subject to PSD review;
3. Air quality impact analysis, unless the net increase in emissions due to the modification causes impacts which are below specified significant impact levels; and
4. Additional impact analysis (e.g., impact on soils, vegetation, visibility), including impacts on PSD Class I areas.

This PSD permit application addresses these requirements and is organized into four additional sections, followed by appendices. A description of the project, including air emission sources and pollution control equipment, is presented in Section 2.0. The regulatory applicability analysis for the proposed project is presented in Section 3.0. The required ambient air monitoring analysis is presented in Section 4.0, and the BACT analysis is presented in Section 5.0. The air quality impact analysis is presented in Section 6.0, and additional impacts upon PSD Class I areas are presented in Section 7.0. Supporting documentation is presented in the Appendices.

The air quality impact analysis conducted for the Lime Kiln petcoke project takes into consideration SSCE's plans to enclose the Recovery Boilers building in order to reduce corrosion and maintenance. The enclosure will be implemented in two phases. The first phase will add an enclosure (wall) only along the east side of the Recovery Boiler building. The second phase will initially consist of adding a second wall along the south side of the building. The Mill may ultimately enclose the entire building. This would represent a worst-case scenario, and is the scenario modeled as "Case 2". The enclosures will affect dispersion of the stack plumes, and will cause SSCE to take lower 24-hour SO_2

emission limits in order to meet ambient air quality standards for SO_2. The proposed lower limits are as follows:

No. 4 Combination Boiler – 690 lb/hr, 24-hour average

Nos. 3 and 4 Combination Boiler – combined cap – 1,350 lb/hr, 24-hour average (Case 1)

Nos. 3 and 4 Combination Boiler – combined cap – 1,100 lb/hr, 24-hour average (Case 2)

2.0 PROJECT DESCRIPTION

SSCE is proposing to add petcoke as an allowable fuel for the Lime Kiln at the Panama City Mill. This project will include replacing the burner in the Lime Kiln, installing a petcoke receiving and transport system that is fully enclosed, and installing a petcoke storage silo and baghouse. The facility is currently operating under Title V Permit No. 0050009-025-AV, issued November 8, 2006. The facility is located at One Everitt Avenue, in Panama City in Bay County. A plot plan of the facility, showing stack locations, is presented in Figure 2-1. The following sections describe the proposed project in more detail.

2.1 Existing operations

SSCE currently operates the Lime Kiln in the chemical recovery process to calcine lime mud and regenerate CaO. The CaO is used in the process to react with green liquor to form white liquor, which is the cooking liquor for the pulp digesters. The existing Lime Kiln has a permitted input rate of 85,000 pounds per hour (lb/hr) [42.5 tons per hour (TPH)] of lime mud (dry basis), based on a 24-hour average. The input rate is based on a maximum production rate of 36,700 lb/hr (18.35 TPH) of CaO (dry basis), 24-hour average.

The Lime Kiln fires No. 6 fuel oil with a maximum S content of 2.5 percent (by weight) or natural gas to support combustion in the Kiln. The maximum heat input rate is 180 MMBtu/hr, 24-hour average. The Lime Kiln is permitted to operate up to 8,760 hours per year (hr/yr).

The Lime Kiln is also the primary combustion device for the destruction of non-condensable gases (NCGs) from the Batch Digester System and the Multiple Effect Evaporator System.

Particulate matter (PM) and SO_2 emissions from the Lime Kiln are controlled by means of a venturi scrubber. Total reduced sulfur (TRS) emissions are controlled by good lime mud washing and proper combustion in the Kiln.

This emissions unit is regulated under Rule 62-296.404, Florida Administrative Code (F.A.C.), Kraft Pulp Mills; and Code of Federal Regulations Title 40, Part 63 (40 CFR 63), Subpart MM, National Emissions Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at

Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills. The unit was required to be in compliance with this subpart in March 2004.

2.2 Proposed Modifications

SSCE is proposing to add petcoke as an allowable fuel for the Lime Kiln. The Lime Kiln is currently permitted to burn No. 6 fuel oil and natural gas, but this project will allow SSCE to burn up to 90 percent petcoke as a substitute to oil/gas. To support petcoke as a substitute fuel, SSCE will install a new 180 MMBtu/hr burner in the Kiln, and install a petcoke receiving and transport system, as well as a petcoke storage silo and baghouse. The changes required to implement this project include:

- Installation of a new petcoke/oil/gas burner with a 180 MMBtu/hr capacity, including dual air zone burner, dual zone gas gun, oil gun, gas/electric igniter, primary air fan, and burner management system;
- Installation of a ground petcoke receiving and conveying system;
- Installation of a ground petcoke storage silo with a capacity of 250 tons, controlled by a baghouse;
- Installation of a dense phase pneumatic conveying system that will be used to unload the delivery trucks and transport the ground petcoke to the storage silo; and
- Installation of a weigh feeder and blower with eductor to pneumatically convey the ground petcoke to the Kiln burner.

The new burner in the Kiln will be capable of burning up to 90 percent petcoke as a substitute to fuel oil or natural gas. Some quantity of fuel oil must be burned in combination with petcoke, in order to support combustion. For the purposes of this application, it is assumed that 100 percent of the heat input (180 MMBtu/hr) to the Kiln will be supplied through the firing of petcoke alone, since the result is a worst-case emissions scenario.

The new Lime Kiln burner will operate at a maximum heat input rate of 180 MMBtu/hr, 24-hour average. Based on a heating value for petcoke of 15,300 British thermal units per pound (Btu/lb), this heat input rate is equivalent to 5.88 TPH of petcoke. This corresponds to a maximum usage of 141.2 tons per day (TPD), or 51,529.4 tons per year (TPY) of petcoke. The maximum sulfur content of the petcoke will be 7 percent.

Ground petcoke will be delivered to the facility via truck, and pneumatically conveyed to a 250-ton storage silo. The conveying air will discharge through a baghouse located on top of the storage silo. From the storage silo, the ground petcoke will drop into a weigh bin before being conveyed to the Kiln burner through the use of a blower and eductor. The piping system that delivers the petcoke to the Kiln burner will be completely enclosed. The displaced air from the weigh bin will be redirected to the storage silo and will exit via the storage silo baghouse. A plan layout of the storage silo is shown in Figure 2-2.

All of the transfers associated with the handling system of the pulverized petcoke involve enclosed piping. However, transport of petcoke by truck traffic on the paved plant roads will potentially cause fugitive PM and PM_{10} (PM with less than or equal to 10 microns in diameter) emissions.

2.3 Air Emission Estimates and Pollution Control Equipment

PM/PM_{10} and SO_2 emissions from the Lime Kiln are currently controlled by a venturi scrubber. This control device will continue to control PM/PM_{10} and SO_2 emissions while firing petcoke. SSCE is proposing to install a storage silo and handling system for the pulverized petcoke. The storage silo will include a baghouse to control PM/PM_{10} emissions from conveying the petcoke and from the weigh bin. The petcoke will be pneumatically transferred from trucks to the storage silo. The conveying air will exit through the baghouse to the atmosphere. As the pulverized petcoke is dropped into the weigh bin before being conveyed to the Kiln burner, the displaced air will also exit to the atmosphere via the storage silo baghouse.

2.3.1 Baseline Actual Emissions

The past actual (baseline actual) annual average emissions for the Lime Kiln are presented in Table 2-1. The basis of the emission estimates are presented in Appendix A. Based on the recently adopted Florida NSR reform rules [Rules 62-210 and 212, Florida Administrative Code (F.A.C.)], the baseline actual emissions are based on a consecutive 24-month period out of the last 10 years. Actual emissions for each of these 10 years (1997-2006) were determined based on operating data, available stack test data, and emission factors. For each pollutant, the consecutive 2-year period with the highest average tons per year (TPY) emissions was selected as the baseline actual emissions for the Lime Kiln. The 2-year averages used for each pollutant are as follows:

- Sulfur Dioxide (SO_2): 2005 - 2006

- Nitrogen Oxides (NO_x): 2005 – 2006
- Carbon Monoxide (CO): 2005 – 2006
- Particulate Matter (PM): 1999 – 2000
- Particulate Matter less than or equal to 10 microns (PM_{10}): 1999 – 2000
- Volatile Organic Compounds (VOCs): 2005 – 2006
- Total Reduced Sulfur (TRS): 1997 – 1998
- Sulfuric Acid Mist (SAM): 2005 – 2006
- Lead (Pb): 2005 – 2006
- Mercury (Hg – H114): 2005 – 2006

The baseline actual emissions for the Lime Kiln shown in Table 2-1 may differ from the annual emissions shown in the Annual Operating Reports (AORs) submitted to the Florida Department of Environmental Protection (FDEP), as described below. The emission factors reported in the AOR for each pollutant, as well as the Lime Kiln operating data, are presented in Appendix A, Table A-1. The revised emission factors used for determining the baseline actual emissions are shown in Appendix A, Table A-2. These emission factors were based on the latest emission factors obtained from National Council for Air and Stream Improvement (NCASI) technical bulletins and from stack testing on the Lime Kiln. It is noted that the basic operation of the Lime Kiln has not changed over the last 10 years.

The resulting baseline actual emissions for each pollutant, based on the revised emission factors, are presented in Appendix A, Table A-3 for each year. The resulting 2-year average emissions for each 2-year period during the last 10 years are presented in Appendix A, Table A-4. The highest 2-year average for each pollutant represents the baseline actual emissions, which are shown in Table 2-1.

Sulfur Dioxide

The SO_2 emission factor used in the past AOR reporting was generally either 0.3 lb/ton air-dried unbleached pulp (ADUP) produced or 0.286 lb/ton CaO produced (see Appendix A, Table A-1). SO_2 emissions from the Lime Kiln, based on special stack test data conducted in 2002 and 2006, are shown in Appendix A, Table A-5. These are the only stack test data available for the Lime Kiln for SO_2. The SO_2 emissions ranged from 0.03 lb/ton CaO to 0.40 lb/ton CaO. Since this range of factors compares favorably with the factors which have been used in the AORs (0.286 lb/ton CaO), the AOR factor of 0.286 lb/ton CaO was used for all years to estimate baseline actual emissions (see Appendix

A, Table A-2). Using the annual lime production rate (from the AOR data), the annual emissions for each year were determined (refer to Appendix A, Table A-3). Emissions for the 2-year period of 2005-2006 were selected for the baseline actual SO_2 emissions (Tables A-4 and 2-1).

Nitrogen Oxides

The NO_x emission factor used in the past AOR reporting was generally either 1.0 lb/ton ADUP produced or 7.9 lb/ton CaO produced (see Appendix A, Table A-1). NO_x emissions from the Lime Kiln, based on a special stack test data conducted in 2006, are shown in Appendix A, Table A-5. This is the only stack test data available for the Lime Kiln for NO_x. The NO_x emissions averaged 2.316 lb/ton CaO. Since this is the only actual NO_x test data available for the Lime Kiln, this emission factor was used for all years to estimate baseline actual emissions (see Appendix A, Table A-2). Using the annual lime production rate (from the AOR data), the annual emissions for each year were determined (refer to Appendix A, Table A-3). Emissions for the 2-year period of 2005-2006 were selected for the baseline actual NO_x emissions (Tables A-4 and 2-1).

Carbon Monoxide

The CO emission factor used in the past AOR reporting was generally either 0.1 lb/ton ADUP produced or 0.386 lb/ton CaO produced (Appendix A, Table A-1). CO emissions from the Lime Kiln have not been measured. The most current NCASI factor for Lime Kilns is 0.181 lb/ton CaO produced, from the NCASI Technical Bulletin No. 884 (see Appendix B). This factor represents the mean of kraft lime kilns. Since there are no actual CO test data available for the Lime Kiln, this emission factor was used for all years to estimate baseline actual emissions (see Appendix A, Table A-2). Using the annual lime production rate (from the AOR data), the annual emissions for each year were determined (refer to Appendix A, Table A-3). Emissions for the 2-year period of 2005-2006 were selected for the baseline actual CO emissions (Tables A-4 and 2-1).

Particulate Matter/PM_{10}

The PM emission factor used in past AOR reporting was based on the annual stack test result in lb/hr (Appendix A, Table A-1). This factor coupled with the annual operating hours was used to calculate annual PM emissions.

The PM emissions limit for the Lime Kiln, 29.83 lb/hr, has not changed over the last 10 years. In March 2004, Maximum Achievable Control Technology (MACT) Requirements for the Pulp and

Paper Industry under 40 CFR 63, Subpart MM became effective on the Lime Kiln. The MACT standards limit PM emissions to 0.064 grains per dry standard cubic foot (gr/dscf) of exhaust gas. However, this equates to approximately 48 lb/hr of PM, which is higher than the current allowable limit of 29.83 lb/hr.

Baseline actual PM emissions were calculated based on annual PM compliance test data conducted over the 10-year period (see Appendix A, Table A-5). The compliance test averages, in lb/hr, were determined for each year. Rule 62-210.370(2)(d)1.a., F.A.C. requires that, when using annual stack test results to calculate baseline actual emissions, a minimum 5-year period that encompasses the 2-year period for which emission estimates are being made must be used, if adequate data is available. To comply with this requirement, in order to determine actual emissions for 1997, the year 1997 and the following four years (1998-2001) were used. Using the average PM emissions in lb/hr, the 5-year average PM emissions in lb/hr was determined (see Appendix A). Using the annual operating hours for the Lime Kiln (from the AOR data), the annual emissions for 1997 were then determined (refer to Appendix A). This process was repeated for each year until the year 2003, when four following years are not available. Therefore, for the years 2003 and beyond, the 5-year average of 2002-2006 was used. Emissions for the 2-year period of 1999-2000 were selected for the baseline actual PM emissions (see Table 2-1 and Appendix A).

PM_{10} emissions reported in the AOR have generally been based on 100 percent of PM emissions. The latest NCASI guidance, issued in response to best available retrofit technology (BART) modeling requirements, shows that PM_{10} from lime kilns with wet scrubbers is on average 84.7 percent of total PM emissions (see Appendix B). This factor was therefore applied to the PM emission factor for each year to obtain PM_{10} emissions (see Appendix A). Emissions for the 2-year period of 1999-2000 were selected for the baseline actual PM emissions (see Table 2-1 and Appendix A).

Volatile Organic Compounds

The VOC emission factor used in past AOR reporting was generally either 0.25 lb/ton ADUP produced, or 0.236 lb/ton CaO produced (see Appendix A). VOC emissions from the Lime Kiln have not been measured. The most current NCASI factor for lime kilns is 0.046 lb/ton CaO produced (see Appendix B). Since there are no actual VOC test data available for the Lime Kiln, this emission factor was used for all years to estimate baseline actual emissions (see Appendix A). Using the annual lime production rate (from the AOR data), the annual emissions for each year were determined (refer to Appendix A). Emissions for the 2-year period of 2005-2006 were selected for the baseline actual VOC emissions (Table 2-1 and Appendix A).

Total Reduced Sulfur

The TRS emission factor used in the past AOR reporting were generally based on continuous emissions monitoring system (CEMS) data (see Appendix A). These data were used along with an assumed gas flow rate to calculate lb/hr TRS, and then used with the annual operating hours. The assumed gas flow rates are shown in Appendix A, Table A-1.

In order to determine baseline actual emissions, the historical stack test exhaust gas flow rates were used in conjunction with the TRS CEMS data for the Lime Kiln. Shown in Appendix A, Table A-5 are the historic stack gas flow rates. The years 2004 and 2005 showed unusually low gas flow rates. Considering the anomalous gas flow rates in 2004 and 2005, the average gas flow rate from all other stack tests during the 10-year period 1997-2006 was used (66,284 dscfm at 10 percent O_2; see Appendix A, Table A-5) and applied to the CEMS TRS data for each year (see Appendix A, Table A-2). The equation to calculate the TRS emissions, in lb/hr, was as follows:

$$\left(\frac{\text{TRS ppmvd}}{10^6\,\text{ft}^3}\right)\left(\frac{66{,}284\ \text{dscf}}{\text{min}}\right)\left(\frac{2{,}116.8\ \text{lb}}{\text{ft}^2}\right)\left(\frac{\text{lb}-\text{mole}-\text{R}}{1{,}545.6\ \text{ft}-\text{lb}_f}\right)\left(\frac{1}{528\ \text{R}}\right)\left(\frac{34\ \text{lb}}{\text{lb}-\text{mole}}\right)\left(\frac{60\ \text{min}}{\text{hr}}\right)=\frac{\text{lb}}{\text{hr}}\text{TRS}$$

where, TRS ppmvd = annual average TRS CEMS concentration at 10 percent O_2

Using the annual operating hours for the Lime Kiln (from the AOR data), the annual emissions for each year were determined (refer to Appendix A, Table A-3). Emissions for the 2-year period of 1997-1998 were selected for the baseline actual TRS emissions (see Table 2-1 and Appendix A).

Sulfuric Acid Mist

Sulfuric acid mist (SAM) emissions have not been reported in the AORs for the Lime Kiln. Therefore, SAM emissions were calculated based on a NCASI emission factor of 0.021 lb/ton CaO produced (see Appendix B). Using the annual CaO production rate for the Lime Kiln (from the AOR data), the annual emissions for each year were determined (refer to Appendix A, Table A-3).

Emissions for the 2-year period of 2005-2006 were selected for the baseline actual SAM emissions (see Table 2-1 and Appendix A, Table A-4).

Lead

Lead (Pb) emissions have not been reported in the AORs for the Lime Kiln. Therefore, Pb emissions were calculated based on a NCASI emission factor of 0.0032 lb/ton CaO produced (see Appendix B). Using the annual CaO production rate for the Lime Kiln (from the AOR data), the annual emissions for each year were determined (refer to Appendix A, Table A-3). Emissions for the 2-year period of 2005-2006 were selected for the baseline actual Pb emissions (see Table 2-1 and Appendix A, Table A-4).

Mercury

Mercury (Hg) emissions have not been reported in the AORs for the Lime Kiln. Therefore, Hg emissions were calculated based on a NCASI emission factor of $6.2x10^{-7}$ lb/ton CaO produced (see Appendix B). Using the annual CaO production rate for the Lime Kiln (from the AOR data), the annual emissions for each year were determined (refer to Appendix A). Emissions for the 2-year period of 2005-2006 were selected for the baseline actual Hg emissions (see Table 2-1 and Appendix A, Table A-4).

Fluorides

There are no emission factors available for fluoride emission from Lime Kilns.

Refer to Appendix A tables and Appendix B for further explanation and references.

2.3.2 Projected Actual Emissions

Lime Kiln

"Projected actual emissions" for the Lime Kiln were developed using the same operating factors used for the baseline actual emissions. Projected annual average heat input and lime production was derived from the highest 2-year period of heat input and lime production during the baseline period (1,126,050 MMBtu/yr during 1999-2000; 159,099 tons CaO/yr during 2005-2006). SSCE does not expect any increase in heat input or CaO production on an annual basis due to the proposed project. The derivation of the projected actual heat input and lime production is shown in Appendix A, Table A-6.

Emission factors used to determine the projected actual emissions were the same as used for the baseline actual emissions, except for SO_2, NO_x and SAM. This is because emissions of all other pollutants are not expected to increase on a lb/MMBtu or lb/ton CaO basis due to the burning of petcoke. The proposed project may increase SO_2, NO_x and SAM emission due to the burning of petcoke.

Projected actual emissions of SO_2 from the Lime Kiln are based on 100 percent petcoke firing, a petcoke heating value of 15,300 Btu/lb, and a maximum petcoke sulfur content of 7 percent. While the Lime Kiln has an 80 percent inherent SO_2 removal efficiency, the venturi scrubber results in an additional 90 percent SO_2 removal efficiency. This results in maximum SO_2 emissions as shown below:

$$\left(\frac{0.07\ \text{lb S}}{\text{lb petcoke}}\right)\left(\frac{2\ \text{lb SO}_2}{\text{lb S}}\right)\left(\frac{\text{lb petcoke}}{15{,}300\ \text{Btu}}\right)\left(\frac{10^6\ \text{Btu}}{\text{MMBtu}}\right)(1-0.8)(1-0.9)=0.183\frac{\text{lb SO}_2}{\text{MMBtu}}$$

Projected actual NO_x emissions for the Lime Kiln are based on petcoke burner vendor estimates for burning petcoke with either natural gas or No. 6 fuel oil. The vendor estimates a NO_x concentration in the flue gases of 105 to 125 ppmvd at 10 percent O_2 when burning petcoke/gas, and between 165 to 185 ppmvd at 10 percent O_2 when burning petcoke/No. 6 fuel oil. Using the worst case fuel mix and the baseline actual exhaust gas flow rate for the Lime Kiln, the projected actual emissions are as follows:

$$\left(\frac{185\ \text{ft}^3}{10^6\ \text{ft}^3}(\text{ppmvd})\right)\left(\frac{66{,}284\ \text{dscf}}{\text{min}}\right)\left(\frac{2{,}116.8\ \text{lb}}{\text{ft}^2}\right)\left(\frac{\text{lb}-\text{mole}-\text{R}}{1{,}545.6\ \text{ft}-\text{lb}_f}\right)\left(\frac{1}{528\ \text{R}}\right)\left(\frac{46\ \text{lb}}{\text{lb}-\text{mole}}\right)\left(\frac{60\ \text{min}}{\text{hr}}\right)=87.8\frac{\text{lb}}{\text{hr}}$$

SAM emissions could increase in proportion to the increase in SO_2 emissions, since SAM is normally directly related to SO_2. Therefore, to project future actual emissions, the baseline SAM emission factor of 0.021 lb/ton CaO was increased by the ratio of projected actual to baseline SO_2 emissions. This results in a projected actual SAM emission factor as follows:

0.021 lb/ton CaO x 103.0 TPY SO_2 / 22.8 TPY SO_2 = 0.095 lb/ton CaO

The maximum hourly TRS emissions are not expected to increase as a result of this project. A report titled "Environmental Considerations and Permitting, Use of Petroleum Coke as Supplemental Fuel in Lime Kilns", prepared December 2003 by Arcadis G&M of Michigan, LLC, recommends that the same TRS emission factor be used for burning natural gas or a combination of natural gas and petcoke. The report states, "When burning pet coke in the Kiln, the sulfur in the pet coke is converted to SO_2. Most of the SO_2 is absorbed by the Lime in the Kiln forming calcium sulfate ($CaSO_4$), also referred to as anhydrite. Anhydrite is a solid and will not be emitted to the air. Therefore, any additional sulfur generated from combusting pet coke in the Lime Kiln will be converted to SO_2 or $CaSO_4$." This is also consistent with SSCE's knowledge of the calcining process.

Projected actual annual emissions for the Lime Kiln are shown in Table 2-2.

Petcoke Handling and Storage

Since the petcoke handling and storage activities are new sources of air emissions, the projected actual emissions from these sources are the same as the future potential emissions. The future potential emissions are described in Section 2.3.3.

2.3.3 Future Potential Emissions

Lime Kiln

The future potential annual emissions for the Lime Kiln are presented in Table 2-3. The table shows the calculations for both the annual and short-term averaging periods. Annual emissions are calculated based on unlimited use of the Lime Kiln [i.e. 8,760 hours per year (hr/yr)]. The future capacity of the Lime Kiln will not be increased over the current capacity of 18.35 TPH CaO. The maximum capacity of the new burner will be 180 MMBtu/hr. When firing No. 6 fuel oil, the maximum sulfur content is 2.5 percent (by weight).

The emission factors used to calculate the future potential emissions are the same as those used to calculate the projected actual emissions, except for PM/PM_{10} and TRS, which have allowable emissions established by permit or rule.

PM potential emissions for the Lime Kiln are calculated from the current allowable PM limit of 28.93 lb/hr, which was established in a previous air permit. PM_{10} potential emissions for the Lime

Kiln are obtained from NCASI letter titled "Particulate Emission Data for Pulp and Paper Industry-Specific Sources" of 84.7 percent of PM from Lime Kilns (August 25, 2006). This factor represents the mean of lime kilns with wet particulate control devices.

TRS potential emissions from the Lime Kiln are calculated from the allowable TRS limit of 20 ppmvd at 10 percent O_2. The potential emissions are further based on assuming the maximum potential stack gas flow rate, 81,400 dscfm at 10 percent O_2, as shown in Table A-5.

Petcoke Handling and Storage

Based on the addition of firing up to 90 percent petcoke as a substitute fuel to No. 6 fuel oil for the Lime Kiln, PM/PM_{10} emissions from the petcoke storage silo and truck transport must be taken into consideration. All other transfers associated with handling the pulverized petcoke involve pneumatic transfers through closed piping. Emission estimates for the worst-case scenario were developed assuming all petcoke is delivered by truck.

To support the amount of petcoke planned to be used by the Lime Kiln, maximum usage of petcoke will be 5.88 TPH, based on a maximum heat input of 180 MMBtu/hr, and 15,300 Btu/lb of petcoke. This corresponds to a maximum usage of 141.2 TPD, or 51,529.4 TPY of ground petcoke. Approximate truck weights are 31,000 (empty truck) and 81,000 lbs (truck filled with ground petcoke), with a petcoke capacity of 50,000 lbs (25 tons). The average number of trucks transporting the petcoke into the facility each day will be six (6), with a maximum per day of ten (10) trucks. The maximum number of truck deliveries per year will be 2,062, based on 51,529.4 TPY of petcoke and 25 tons per truck.

The AP-42 equation was used to estimate fugitive dust emissions for trucks on paved roads (Section 13.2.1, December 2003). This emission factor is used with the roundtrip distance (1.5 miles) the trucks will be traveling, the maximum amount of trucks per day (10) and per year (2,062), and the average weight of the truck fleet (28 tons) to determine PM and PM_{10} annual and hourly emissions. The equation used to calculate the truck traffic emissions is:

$$E = k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5}$$

where, E is the particulate emission rate (in lb/VMT),

VMT is the vehicle miles traveled,

k is the base emission factor for particulate size range (0.082 lb/VMT for PM, 0.016 lb/VMT for PM_{10}),

sL is the road surface silt loading (0.4 g/m^2), and W is the average weight of the vehicles traveling the road.

Using the equation and the truck traffic mileage, potential maximum emissions for PM are 0.51 lb/hr and 1.27 TPY, and potential maximum emissions for PM_{10} are 0.10 lb/hr and 0.25 TPY. The calculations are seen in the table below:

	Roundtrip Distance (miles)	Annual Distance (VMT/yr)	Average Weight (tons)	E (lb PM / VMT)	PM Maximum Emissions	E (lb PM_{10} / VMT)	PM_{10} Maximum Emissions
Maximum Long-term Emissions	1.5	3,093	28	0.821	1.27 TPY	0.160	0.25 TPY
Maximum Short-term Emissions	1.5	15	28	0.821	0.51 lb/hr	0.160	0.10 lb/hr

Pulverized petcoke will be pneumatically conveyed to a storage silo from trucks. The storage silo will be equipped with a fan and baghouse. This baghouse will also serve to collect displaced dust emissions from the weigh bin drop. Based on vendor-supplied exhaust gas flow rate (2,000 acfm) grain loading (0.02 gr/acf), and a weight (1 lb per 7,000 grains of petcoke), the potential emissions of PM/PM_{10} from the storage silo are calculated as follows:

$$\left(\frac{2000\,ft^3}{min}(acfm)\right)\left(\frac{0.02\ grains}{ft^3}\right)\left(\frac{lb}{7{,}000\ grains}\right)\left(\frac{60\ min}{hr}\right) = 0.34\frac{lb}{hr}$$

$$\left(0.34\frac{lb}{hr}\right)\left(\frac{8{,}760\,hr}{yr}\right)\left(\frac{ton}{2{,}000\,lb}\right) = 1.50\ TPY$$

Potential emissions of PM_{10} are calculated to be 100 percent of PM emissions. Normally, the baghouse and fan will only be operational during silo loading; however, estimated emissions reflect continuous operation, even though proposed operations are intermittent.

2.4 Effects on Other Emissions Units

No other emission units at the SSCE Panama City Mill will be affected by the proposed addition of petcoke as the primary fuel for the Lime Kiln. The addition of petcoke as a fuel will only affect the Lime Kiln since this is only a fuel switch, and will not affect Lime Kiln production.

However, as discussed in Section 1.0, SSCE is planning the partial and total enclosure of the existing Recovery Boilers building at the Mill. The Recovery Boilers building is an open superstructure, which contains the Nos. 1 and 2 Recovery Boilers and Nos. 1 and 2 Smelt Dissolving Tanks. Located just to the east of the building are a set of cooling towers. The cooling towers drift can at times impact the building. This, coupled with other factors, has led to increased maintenance issues on the Recovery Boilers. As a result, SSCE desires to enclose the building. This would generally just require the installation of siding on the superstructure.

SSCE would like to perform the enclosure in two phases: Phase 1 would be to install siding on only the east side of the building. Phase 2 would be to add siding to the remaining three sides, resulting in a total enclosure.

Based on these plans, air dispersion modeling has been conducted to determine the effects upon compliance with the AAQS for SO_2. Both phases of the building enclosure were evaluated: Case 1 – one side enclosed; and Case 2 – building totally enclosed. The results of the modeling are presented in Section 6.0 and are based on the following restrictions on SO_2 emissions from the Nos. 3 and 4 Combination Boilers:

No. 3 Combination Boiler – 887 lb/hr, 24-hour average
No. 4 Combination Boiler – 690 lb/hr, 24-hour average
Case 1 – Nos. 3 and 4 Combination Boilers – combined cap of 1,350 lb/hr, 24-hour average
Case 2 – Nos. 3 and 4 Combination Boilers – combined cap of 1,100 lb/hr, 24-hour average

TABLE 2-1
SUMMARY OF BASELINE ACTUAL EMISSIONS FROM LIME KILN, SSCE

Source Description	Pollutant Emission Rate (TPY) [a]										
	SO_2	NO_x	CO	PM	PM_{10}	VOC	TRS	SAM	Lead	Mercury	Fluorides
Average Actual Emissions of Highest 2-Year Period											
	'05-'06	'05-'06	'05-'06	'99-'00	'99-'00	'05-'06	'97-'98	'05-'06	'05-'06	'05-'06	--
Lime Kiln	22.8	184.2	14.4	97.3	85.0	3.66	10.3	1.67	0.25	4.93E-05	0.0

TPY = Tons per year.
Notes:
[a] Refer to tables in Appendix A for derivation.

TABLE 2-2
PROJECTED ACTUAL EMISSIONS FOR THE LIME KILN, SSCE PANAMA CITY

Pollutant	Emission Factor	Ref.	Activity Factor[a]	Annual Emissions (TPY)
SO_2	0.183 lb/MMBtu	1	1,126,050 MMBtu/yr	103.0
NO_x	87.8 lb/hr	2	8,408 hr/yr	369.1
CO	0.181 lb/ton CaO	3	159,099 ton CaO/yr	14.4
PM	26.49 lb/hr	4	8,408 hr/yr	111.4
PM_{10}	22.44 lb/hr	5	8,408 hr/yr	94.3
VOC	0.046 lb/ton CaO	3	159,099 ton CaO/yr	3.7
TRS	10.56 ppm @ 10% O_2	6	66,284 dscfm @ 10% O_2 8,408 hr/yr	15.6
SAM	0.0951 lb/ton CaO	7	159,099 ton CaO/yr	7.57
Lead	0.0032 lb/ton CaO	3	159,099 ton CaO/yr	0.25
Mercury	6.20E-07 lb/ton CaO	3	159,099 ton CaO/yr	4.93E-05

[a] Activity factors based on actual maximum 2-year average heat input, hours of operation, lime production in AORs, as well as stack testing. See Tables A-5 through A-7.

References:
1 Based on 7% S in petcoke, 15,300 Btu/lb of petcoke, and SO_2 removal efficiencies of 80 and 90%.
2 Based on vendor maximum emissions estimate of 185 ppm when firing 20/80 mix of fuel oil/petcoke.
3 See Table A-2 for past actual emission factors.
4 Maximum reported rates from stack testing. See Table A-5.
5 Emission factor is 84.7% of PM, obtained from NCASI "Particulate Emission Data for Pulp and Paper Industry-Specific Sources" (August 25, 2006)
6 Maximum reported rates from stack testing. See Table A-6.
7 Based on emission factor from Table A-2 multiplied by the ratio of the projected actual SO_2 annual emissions and the baseline actual annual emissions, because the increase in SAM emissions is directly correlated to the increase in SO_2 emissions.

TABLE 2-3
FUTURE POTENTIAL EMISSIONS FOR THE LIME KILN, SSCE PANAMA CITY

			Short-Term		Annual Average	
Pollutant	Emission Factor	Ref.	Activity Factor	Emissions (lb/hr)	Activity Factor	Emissions (TPY)
SO_2	0.183 lb/MMBtu	1	180 MMBtu/hr	32.9	1,576,800 MMBtu/yr	144.3
NO_x	185 ppm	2	81,400 dscfm @ 10% O_2	107.8	8,760 hr/yr	472.2
CO	0.181 lb/ton CaO	3	18.35 ton CaO/hr	3.3	160,746 ton CaO/yr	14.5
PM	29.83 lb/hr	4	1 hr	29.83	8,760 hr/yr	130.7
PM_{10}	25.27 lb/hr	5	1 hr	25.27	8,760 hr/yr	110.7
VOC	0.046 lb/ton CaO	3	18.35 ton CaO/hr	0.84	160,746 ton CaO/yr	3.7
TRS	20 ppm @ 10% O_2 (12-hr avg)	4	81,400 dscfm @ 10% O_2	8.6	8,760 hr/yr	37.7
SAM	0.0951 lb/ton CaO	6	18.35 ton CaO/hr	1.75	160,746 ton CaO/yr	7.64
Lead	0.0032 lb/ton CaO	3	18.35 ton CaO/hr	0.059	160,746 ton CaO/yr	0.26
Mercury	6.2E-07 lb/ton CaO	3	18.35 ton CaO/hr	1.14E-05	160,746 ton CaO/yr	4.98E-05

References:
1 Based on 7% S in petcoke, 15,300 Btu/lb of petcoke, and SO_2 removal efficiencies of 80 and 90%.
2 Based on vendor maximum emissions estimate of 185 ppm when firing 20/80 mix of fuel oil/petcoke.
3 See Table A-2 for past actual emission factors.
4 Based on maximum emission limit defined in Permit No. 0050009-020-AV.
5 Emission factor is 84.7% of PM, obtained from NCASI "Particulate Emission Data for Pulp and Paper Industry-Specific Sources" (August 25, 2006)
6 Based on emission factor from Table A-2 multiplied by the ratio of the projected actual SO_2 annualemissions and the baseline actual annual emissions, because the increase in SAM emissions is directly correlated to the increase in SO_2 emissions.

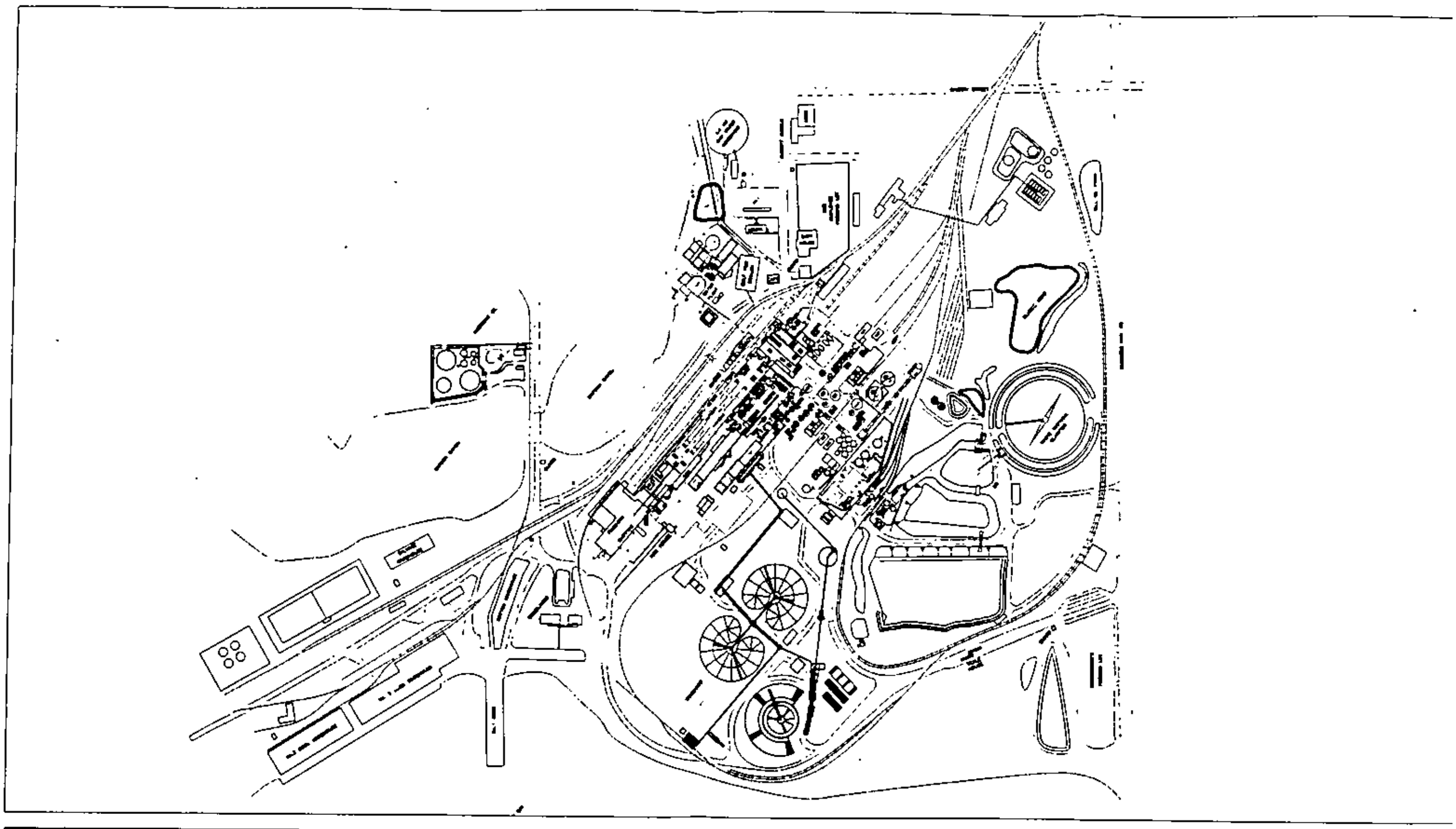
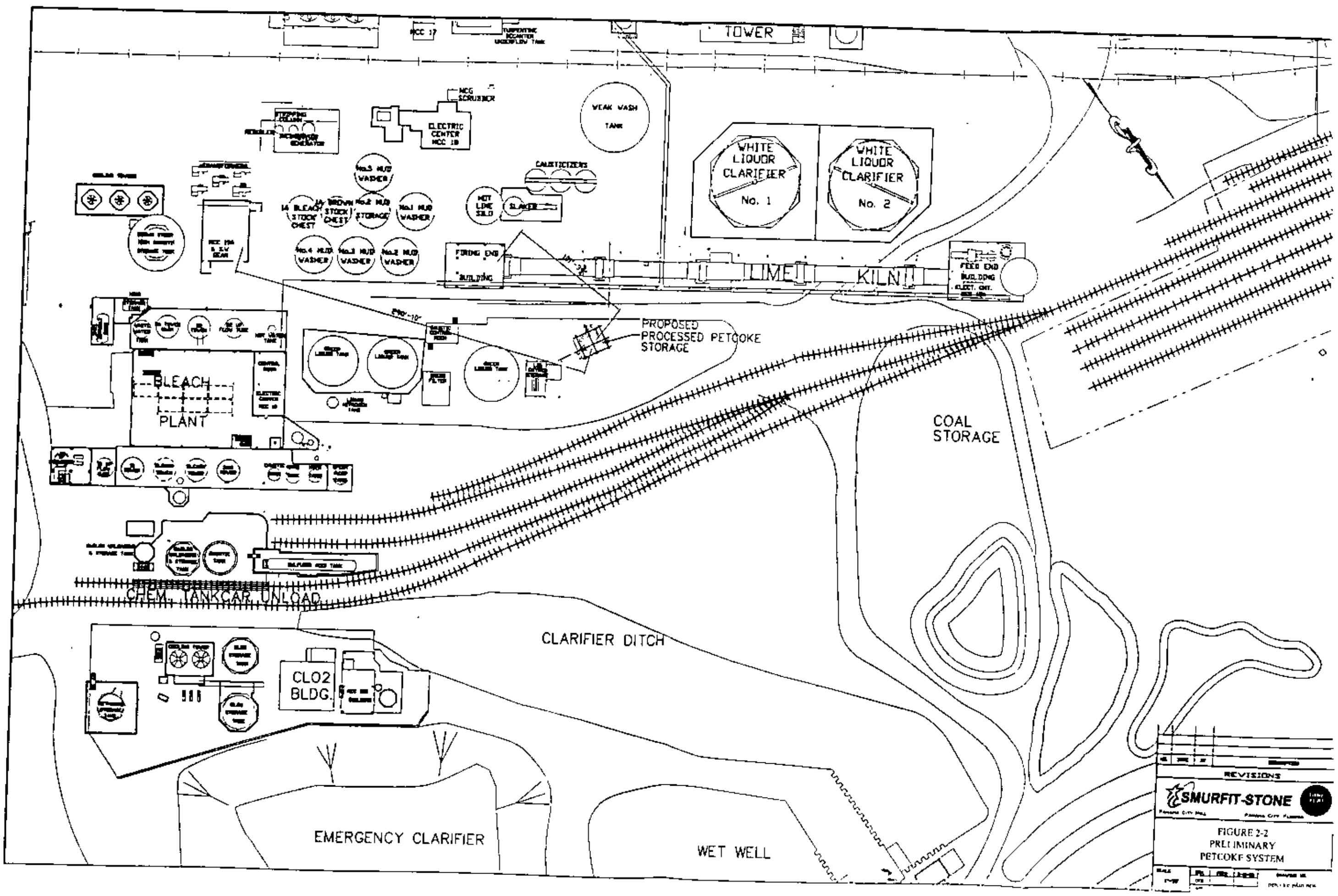


FIGURE 2-1. FACILITY PLOT PLAN STONE CONTAINER ENTERPRISES, INC. PANAMA CITY, FL	FILENAME: 0637645/4.4/PSD/FIGURE 2-1 LATEST REVISION: 12/02/04	Golder Associates


TOWER
WEAK WASH TANK
ELECTRIC CENTER MCC 1B
NCG SCRUBBER
CAUSTICIZERS
WHITE LIQUOR CLARIFIER No. 1
WHITE LIQUOR CLARIFIER No. 2
No.5 MUD WASHER
No.2 MUD STORAGE
No.1 MUD WASHER
No.4 MUD WASHER
No.3 MUD WASHER
No.2 MUD WASHER
HOT LIME SILO
SLAKER
FIRING END BUILDING
LIME
KILN
FEED END BUILDING
PROPOSED
PROCESSED PETCOKE
STORAGE
BLEACH
PLANT
COAL
STORAGE
CHEM. TANKCAR UNLOAD
CLARIFIER DITCH
CLO2
BLDG.
EMERGENCY CLARIFIER
WET WELL
REVISIONS
SMURFIT-STONE
FIGURE 2-2
PRELIMINARY
PETCOKE SYSTEM

3.0 AIR QUALITY REVIEW REQUIREMENTS

Federal and State air regulatory requirements for a major new or modified source of air pollution are discussed in Sections 3.1 through 3.3. The applicability of these regulations to the proposed SSCE modification is presented in Section 3.4. These regulations must be satisfied before the proposed projects can be approved.

3.1 National and State Ambient Air Quality Standards

The existing applicable national and Florida Ambient Air Quality Standards (AAQS) are presented in Table 3-1. Primary national AAQS were promulgated to protect the public health, and secondary national AAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of AAQS are designated as nonattainment areas and new or modified sources to be located in or near these areas may be subject to more stringent air permitting requirements.

Florida has adopted State AAQS in Rule 62-204.240, Florida Administrative Code (F.A.C.). These standards are the same as the national AAQS, except in the case of SO_2. For SO_2, Florida has adopted the former 24-hour secondary standard of 260 micrograms per cubic meter ($\mu g/m^3$) and the former annual average secondary standard of 60 $\mu g/m^3$.

3.2 PSD Requirements

3.2.1 General Requirements

Under federal and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and a pre-construction permit issued. Florida's State Implementation Plan (SIP), which contains PSD regulations, has been approved by the EPA. Therefore, PSD approval authority has been granted to the FDEP.

For Kraft pulp mills, a "major facility" is defined as one that has the "potential-to-emit" 100 TPY or more of any pollutant regulated under the CAA. "Potential-to-emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment.

For an existing source for which a modification is proposed, the modification is subject to PSD review if the net increase in emissions due to the modification is greater than the PSD significant emission rates (i.e., a "major modification"). The PSD significant emission rates are listed in Table 3-2. The determination of whether a significant net increase in emissions will occur is based on comparison of "baseline actual emissions" to "projected actual emissions" for all emission units affected by the proposed project, including any contemporaneous increases or decreases which have occurred at the facility in the last five years. See Section 3.4.2.1 for further discussion of these concepts.

The EPA class designation and allowable PSD increments are also presented in Table 3-1. The magnitude of the allowable increment depends on the classification of the area in which a new source (or modification) will be located or have an impact. Three classifications are designated based on criteria established in the 1977 CAA Amendments. Congress promulgated areas as Class I (international parks, national wilderness areas, and memorial parks larger than 5,000 acres and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. The State of Florida has adopted the EPA class designations and allowable PSD increments for SO_2, PM_{10}, and nitrogen dioxide (NO_2).

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. Federal PSD requirements are contained in Title 40 of the CFR, Section 52.21 (Prevention of Significant Deterioration of Air Quality). The State of Florida has adopted PSD regulations that are equivalent to the federal PSD regulations (Rule 62-212.400, F.A.C.). Major facilities and major modifications are required to undergo the following analyses related to PSD for each pollutant for which the emissions increase is significant:

- Control technology review;
- Source impact analysis;
- Air quality analysis (monitoring); and
- Additional impact analyses.

In addition to these analyses, a new or modified facility must also be reviewed with respect to Good Engineering Practice (GEP) stack height regulations. Discussions concerning each of these requirements are presented in the following sections.

3.2.2 Control Technology Review

The control technology review requirements of the federal and State PSD regulations require that all applicable federal and State emission-limiting standards be met, and that BACT be applied to control emissions from the source. The BACT requirements are applicable to all regulated pollutants for which the increase in emissions from the facility exceeds the significant emission rate (see Table 3-2).

BACT is defined in 40 CFR 52.21(b)(12), as:

> *An emissions limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Act which would be emitted by any proposed major stationary source or major modification which the Administrator, 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. In no event shall application of best available control technology result in emissions of any pollutant, which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60 and 61. If the Administrator 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 and shall provide for compliance by means which achieve equivalent results.*

BACT was promulgated within the framework of the PSD requirements in the 1977 amendments of the CAA [Public Law 95-95; Part C, Section 165(a)(4)]. The primary purpose of BACT is to optimize consumption of PSD air quality increments and thereby enlarge the potential for future economic growth without significantly degrading air quality (EPA, 1978; 1980). Guidelines for the evaluation of BACT can be found in EPA's Guidelines for Determining BACT (EPA, 1978) and in the PSD Workshop Manual (EPA, 1980). These guidelines were promulgated by EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. In addition, through implementation of these guidelines, BACT in one area may not be identical to BACT in another area. According to EPA (1980), "BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis."

The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed or modified facility reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. BACT must, as a minimum, demonstrate compliance with New Source Performance Standards (NSPS) for a source (if applicable). An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emission reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A decision on BACT is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts (EPA, 1978).

3.2.3 Source Impact Analysis

A source impact analysis must be performed for a proposed major source or major modification subject to PSD review and for each pollutant for which the increase in emissions exceeds the PSD significant emission rate (Table 3-2). The PSD regulations specifically provide for the use of atmospheric dispersion models in performing impact analyses, estimating baseline and future air quality levels, and determining compliance with AAQS and allowable PSD increments. Designated EPA models normally must be used in performing the impact analysis. Specific applications for other than EPA-approved models require EPA's consultation and prior approval. Guidance for the use and application of dispersion models is presented in the EPA publication *Guideline on Air Quality Models* (EPA, 1980).

To address compliance with AAQS and PSD Class I and II increments, a source impact analysis must be performed. However, this analysis is not required for a specific pollutant if the net increase in impacts as a result of the new source or modification is below significant impact levels, as presented in Table 3-1. The significant impact levels are threshold levels that are used to determine the level of air impact analyses needed for the project. If the new or modified source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse effect on air quality. Additional modeling, taking into account other emission sources, is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling, including other emission sources, is required in order to demonstrate compliance with AAQS and PSD increments.

EPA has issued guidance related to significant impact levels for Class I areas, as shown in Table 3-1. Although these levels have not been officially promulgated as part of the PSD review process and may not be binding for States in performing PSD reviews, the levels serve as a guideline in assessing a source's impact in a Class I area. The EPA action to incorporate Class I significant impact levels into the PSD process is part of implementing the NSR regulations. Because the process of developing the regulations will be lengthy, EPA believes that the guidance concerning the significant impact levels is appropriate to assist States in implementing the PSD permit process.

Various lengths of record for meteorological data can be used for impact analyses. A 5-year period is normally used with corresponding evaluation of highest, second-highest short-term concentrations for comparison to AAQS or PSD increments. The meteorological data are selected based on an evaluation of measured weather data from a nearby weather station that represents weather conditions at the project site. The criteria used in this evaluation includes: determining the distance of the project site to the weather station; comparing topographical and land use features between the locations; and determining availability of necessary weather parameters.

The term "highest, second-highest" (HSH) refers to the highest of the second-highest concentrations at all receptors (*i.e.*, the highest concentration at each receptor is discarded). The second-highest concentration is important because short-term AAQS specify that the standard should not be exceeded at any location more than once a year. If fewer than 5 years of meteorological data are used in the modeling analysis, the highest concentration at each receptor normally must be used for comparison to air quality standards.

The term "baseline concentration" evolves from federal and State PSD regulations and refers to a concentration level corresponding to a specified baseline date and certain baseline sources. By definition, in the PSD regulations as amended August 7, 1980, baseline concentration means the ambient concentration level that exists in the baseline area at the time of the applicable baseline date. A baseline concentration is determined for each pollutant for which a baseline date is established and includes:

- The actual emissions representative of facilities in existence on the applicable baseline date; and
- The allowable emissions of major stationary facilities that commenced construction before January 6, 1975, for SO_2 and PM_{10}, or February 8, 1988, for NO_2, but that were not in operation by the applicable baseline date.

The following emissions are not included in the baseline concentration, and therefore, affect PSD increment consumption:

- Actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for SO_2 and PM_{10}, and after February 8, 1988, for NO_2; and
- Actual emission increases and decreases at any stationary facility occurring after the baseline date.

In reference to the baseline concentration, the term "baseline date" actually includes three different dates:

- The major facility baseline date, which is January 6, 1975, in the cases of SO_2 and PM_{10}, and February 8, 1988, in the case of NO_2;
- The trigger date, which is August 7, 1977, for SO_2 and PM_{10}, and February 8, 1988, for NO_2; and
- The minor facility baseline date, which is the earliest date after the trigger date on which a major stationary facility or major modification subject to PSD regulations submits a complete PSD application.

3.2.4 Air Quality Monitoring Requirements

In accordance with requirements of 40 CFR 52.21(m), any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate (see Table 3-2).

Ambient air monitoring for a period of up to 1 year generally is appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed/modified source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (EPA, 1987a).

The regulations include an exemption that excludes or limits the pollutants for which an air quality monitoring analysis must be conducted. This exemption states that FDEP may exempt a proposed major stationary facility or major modification from the monitoring requirements, with respect to a particular pollutant, if the emissions increase of the pollutant from the facility or modification would cause, in any area, air quality impacts less than the *de minimis* levels presented in Table 3-2.

3.3 Source Information/GEP Stack Height

Source information must be provided to adequately describe the proposed project. The general type of information required for this project is presented in Section 2.0.

The 1977 CAA Amendments require that the degree of emission limitation required for control of any pollutant not be affected by a stack height that exceeds GEP or any other dispersion technique. On July 8, 1985, EPA promulgated final stack height regulations (EPA, 1985a). The FDEP has adopted identical regulations (Rule 62-210.550, F.A.C.). GEP stack height is defined as the highest of:

- 65 meters (m); or
- A height established by applying the formula:

$$Hg = H + 1.5L$$

where: Hg = GEP stack height,

H = Height of the structure or nearby structure, and

L = Lesser dimension (height or projected width) of nearby structure(s); or

- A height demonstrated by a fluid model or field study.

"Nearby" is defined as a distance up to five times the lesser of the height or width dimensions of a structure or terrain feature, but not greater than 0.8 kilometer (km). Although GEP stack height regulations require that the stack height used in modeling for determining compliance with AAQS and PSD increments not exceed the GEP stack height, the actual stack height may be greater.

The stack height regulations also allow increased GEP stack height beyond that resulting from the above formula in cases where plume impaction occurs. Plume impaction is defined as concentrations measured or predicted to occur when the plume interacts with elevated terrain. Elevated terrain is defined as terrain that exceeds the height calculated by the GEP stack height formula.

3.3.1 Additional Impact Analysis

In addition to air quality impact analyses, federal and State of Florida regulations require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of the proposed source or proposed modification [40 CFR 52.21(o) and Rule 62-212.400, F.A.C.]. These analyses are to be conducted primarily for PSD Class I areas. Impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed. These analyses are required for each pollutant emitted in significant amounts (Table 3-2).

3.4 Potentially Applicable Emission Standards

3.4.1 New Source Performance Standards

The NSPS are a set of national emission standards that apply to specific categories of new sources. As stated in the CAA Amendments of 1970, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction the Administrator determines has been adequately demonstrated."

Existing non-NSPS sources may become subject to the NSPS if such sources undergo a "modification" or "reconstruction". "***Modification***" means any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.

"***Reconstruction***" means the replacement of components of an affected facility to such an extent that:

1. The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility; and
2. It is technologically and economically feasible to meet the applicable standards set forth in this part.

40 CFR 60.5 defines "***fixed capital cost***" as the capital needed to provide all the depreciable components. 40 CFR 60.2 defines "***capital expenditure***" as:

> *an expenditure for a physical or operational change to an existing facility which exceeds the product of the applicable "annual asset guideline repair percentage" specified in the latest edition of IRS Publication 534 and the existing facility's basis, as defined by Section 1012 of the IRS Code. However, the total expenditure for a physical or operational change to an existing facility must not be reduced by any "excluded additions" as defined in IRS Publication 534, as would be done for tax purposes.*

Federal NSPS exist for Kraft Pulp Mills constructed or modified after September 24, 1976. The NSPS are contained in 40 CFR 60, Subpart BB and contain emission limits for PM and TRS for lime kilns. According to the NSPS definition, a lime kiln is a unit used to calcine lime mud, which consists primarily of calcium carbonate, into quicklime, which is calcium oxide.

3.4.2 National Emission Standards for Hazardous Air Pollutants (NESHAP)

The National Emission Standards for Hazardous Air Pollutants for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills were promulgated on January 12, 2001. These are codified in 40 CFR 63, Subpart MM, and are commonly referred to as maximum achievable control technology – phase two (MACT II) standards. The standards apply to both existing and new Lime Kilns located at Kraft pulp mills.

The MACT General Provisions, in 40 CFR 63.2, define a new source as, "…any affected source the construction or reconstruction of which is commenced after the Administrator first proposes a relevant emission standard under this part." The Lime Kiln at the SSCE Panama City Mill was constructed well prior to the proposal date for this NESHAP. Therefore, the Lime Kiln is an existing source, unless it becomes "reconstructed". Under the MACT General Provisions (40 CFR 63, Subpart A), *reconstruction* is defined as follows:

Reconstruction, unless otherwise defined in a relevant standard, means the replacement of components of an affected or previously nonaffected source to such an extent that:

1. The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and
2. It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator pursuant to Section 112 of the Act. Upon reconstruction, an affected source, or a stationary source that becomes an affected source, is subject to relevant standards for new sources, including compliance dates, irrespective of any change in emission of hazardous air pollutants from that source.

3.4.3 Florida Rules

Emission limitations applicable to Kraft (Sulfate) Pulp Mills and Tall Oil Plants are contained in Rule 62-296.404 of the Florida Administrative Code (F.A.C.). This rule limits TRS emissions, as well as visible emissions, from Lime Kilns.

3.5 Source Applicability

3.5.1 Area Classification

The project site is located in Bay County, which has been designated by EPA and FDEP as an attainment or maintenance area for all criteria pollutants. Bay County and surrounding counties are designated as PSD Class II areas for all criteria pollutants. The SSCE Panama City Mill is located within 200 km of two PSD Class I areas- St. Marks National Wilderness Area (NWA) and Bradwell Bay NWA. The Class I areas in relation to the Panama City Mill are shown in Figure 3-1

3.5.2 PSD Review

Pollutant Applicability

The SSCE Panama City Mill is considered to be an existing major stationary facility because potential emissions of at least one PSD-regulated pollutant exceed 100 TPY (for example, potential NO_X emissions currently exceed 100 TPY). Therefore, PSD review is required for any pollutant for which the net increase in emissions due to the modification is greater than the PSD significant emission rates (see Table 3-2).

The net increase in emissions due to the proposed modification at the SSCE Panama City Mill is summarized in Table 3-3. For the Lime Kiln, the baseline actual emissions and projected actual emissions are based on information from Section 2.0. The future potential emissions from the petcoke storage silo and truck traffic are included in the table.

As shown in Table 3-3, the increase in emissions due to the project exceeds the significance levels for several PSD pollutants. For these pollutants, the PSD regulations require that all contemporaneous emissions increases and decreases be included in a netting analysis to determine PSD applicability. These emission changes are included in the bottom portion of Table 3-3. Also presented is the total net increase in emissions, considering the contemporaneous emission changes. As shown in Table 3-3, the net increase in emissions exceeds the PSD significant emission rates for SO_2 and NO_X. Therefore, PSD review applies for these pollutants.

Source Impact Analysis

A source impact analysis was performed for SO_2 and NO_X emissions resulting from the proposed modification. This analysis is presented in Section 6.0.

Ambient Monitoring

Based on the increase in emissions from the proposed modification (see Table 3-3), a pre-construction ambient monitoring analysis would be required for SO_2 and NO_X, and monitoring data would be required to be submitted as part of the application. However, if the net increase in impacts of a pollutant is less than the applicable *de minimis* monitoring concentration, then an exemption from submittal of pre-construction ambient monitoring data may be obtained [40 CFR 52.21(i)(8)]. In addition, if EPA has not established an acceptable ambient monitoring method for the pollutant, monitoring is not required.

Pre-construction monitoring data for SO_2 and NO_2 can be exempted for this project because, as shown in Section 6.0, the proposed modification's impacts are predicted to be less than the applicable *de minimis* monitoring concentrations for these pollutants.

GEP Stack Height Impact Analysis

All existing stacks at the SSCE facility currently comply with GEP stack height regulations. The stack height of the Lime Kiln is 18.44 meters (60.5 feet), and the height of the petcoke storage silo discharge point, which is proposed as part of this project, is 37.6 meters (123.5 feet). GEP stack height is 65 meters (213 feet); therefore, the proposed modification will comply with the GEP stack height regulations.

3.5.3 Emission Standards

New Source Performance Standards

The Lime Kiln is currently not subject to NSPS contained in 40 CFR 60, Subpart BB. The Lime Kiln was constructed prior to the 1976 proposal date of this NSPS. In addition, the Lime Kiln has not been previously reconstructed or modified to an extent that would have triggered applicability of NSPS Subpart BB.

As discussed in Section 2.0, maximum hourly emissions of TRS compounds are not expected to increase as a result of this project. An increase in annual TRS emissions is shown in Table 3-3 solely as a result of the requirement to compare baseline actual to future actual emissions in conducting a PSD applicability assessment. Furthermore, the cost of the changes to the Lime Kiln itself ($2.6 million), will not exceed 50 percent of the replacement cost of the Lime Kiln, which is estimated to be at least $30 million. As such, the Kiln is not being "reconstructed" as part of this project, and the NSPS for TRS emissions will not be triggered as a result of this project.

The Lime Kiln is potentially subject to NSPS contained in 40 CFR 60 Subpart BB for PM emissions. The NSPS limit for PM is 0.066 gr/dscf corrected to 10 percent oxygen for Lime Kilns burning gaseous fuel and 0.13 gr/dscf corrected to 10 percent oxygen for Lime Kilns burning liquid fuel. There are no specific NSPS limits for Lime Kilns burning solid fuels such as coal or petcoke. Since the Lime Kiln is permitted to burn both No. 6 fuel oil and natural gas, the Kiln is potentially subject to both PM emission limits. However, these limits are actually less restrictive than the MACT II limit of 0.064 gr/dscf and the current permit allowable of 29.83 lb/hr. Therefore, while the triggering of this NSPS for PM would not act to tighten the PM limit for the Lime Kiln, it would result in certain testing, recordkeeping, reporting and notification requirements as detailed in NSPS Subpart BB and the NSPS General Provisions.

NESHAPs for Source Categories

The Lime Kiln is considered an "existing source" for the purposes of MACT applicability, and permit conditions contained in the Mill's Title V permit already address the MACT requirements. 40 CFR 63 Subpart MM regulates emissions of PM from lime kilns.

The Lime Kiln is subject to a MACT II PM limit of 0.064 gr/dscf, corrected to 10 percent oxygen. Since the Lime Kiln is equipped with a venturi scrubber to control PM emissions, it is subject to continuous parameter monitoring system (CPMS) requirements, which require that pressure drop across the scrubber and scrubbing liquid flow rate be monitored at least once every successive 15-minute period. The Lime Kiln currently complies with these standards and requirements.

As discussed previously, the cost of the changes to the Lime Kiln itself ($2.6 million), will not exceed 50 percent of the replacement cost of the Lime Kiln, which is estimated to be at least $30 million. As such, the Kiln is not being "reconstructed" as part of this project, and the new source MACT for PM emissions will not be triggered as a result of this project.

State of Florida Standards

Emission limitations applicable to Kraft (Sulfate) Pulp Mills and Tall Oil Plants are contained in Rule 62-296.404 of the Florida Administrative Code (F.A.C.). This rule limits TRS emissions, as well as visible emissions, from Lime Kilns.

The Lime Kiln is subject to an opacity standard of 20 percent, according to Rule 62-296.404(2)(b), F.A.C., which is effective only if the VE measurement can be made without being substantially affected by plume mixing or moisture condensation.

TRS is limited to 20 ppmvd corrected to 10 percent O_2 as a 12-hour average under this rule, which also contains provisions for a continuous emissions monitoring system (CEMS) for TRS (Rule 62-296.404(3)(e), F.A.C.). The Lime Kiln will comply with the CEMS requirement. The Lime Kiln will continue to be subject to the testing, recordkeeping, reporting, and notification requirements as detailed in Rule 62-296.404, F.A.C.

TABLE 3-1. NATIONAL AND STATE AAQS, ALLOWABLE PSD INCREMENTS, AND SIGNIFICANT IMPACT LEVELS (μg/m³)

		AAQS			PSD Increments		Significant Impact Levels[d]	
Pollutant	Averaging Time	National Primary Standard	National Secondary Standard	State of Florida	Class I	Class II	Class I (proposed)	Class II
Particulate Matter[a] (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	0.2	1
	24-Hour Maximum[b]	150[b]	150[b]	150[b]	8	30	0.3	5
Sulfur Dioxide	Annual Arithmetic Mean	80	N/A	60	2	20	0.1	1
	24-Hour Maximum[c]	365[b]	N/A	260[b]	5	91	0.2	5
	3-Hour Maximum[b]	NA	1,300[b]	1,300[b]	25	512	1	25
Carbon Monoxide	8-Hour Maximum[b]	10,000[b]	10,000[b]	10,000[b]	N/A	N/A	N/A	500
	1-Hour Maximum[b]	40,000[b]	40,000[b]	40,000[b]	N/A	N/A	N/A	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	0.1	1
Ozone[a]	1-Hour Maximum	235[c]	235[c]	235[c]	N/A	N/A	N/A	N/A
	8-Hour Maximum	157	157	N/A	N/A	N/A	N/A	N/A
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	N/A	N/A	N/A	N/A

Note: NA = Not applicable, *i.e.*, no standard exists.
PM_{10} = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.

[a]On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, $PM_{2.5}$ standards were introduced with a 24-hour standard of 65 μg/m³ (3-year average of 98th percentile) and an annual standard of 15 μg/m³ (3-year average at community monitors). The ozone standard was modified to be 0.08 ppm (157 μg/m³) for an 8-hour average; achieved when 3-year average of 99th percentile is 0.08 ppm or less. FDEP has not yet adopted either of these standards.

[b]Short-term maximum concentrations are not to be exceeded more than once per year except for the PM_{10} AAQS (these do not apply to significant impact levels). The PM_{10} 24-hour AAQS is attained when the expected number of days per year with a 24-hour concentration above 150 μg/m³ is equal to or less than 1. For modeling purposes, compliance is based on the sixth-highest 24-hour average value over a 5-year period.

[c]Achieved when the expected number of days per year with concentrations above the standard is fewer than 1.

[d]Maximum concentrations.

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978; 40 CFR 50; 40 CFR 52.21; Rule 62-204, F.A.C.

TABLE 3-2
PSD SIGNIFICANT EMISSION RATES AND *DE MINIMIS* MONITORING CONCENTRATIONS

Pollutant	Significant Emission Rate (TPY)	De Minimis Monitoring Concentration[a] ($\mu g/m^3$)
Sulfur Dioxide	40	13, 24-hour
Particulate Matter [PM(TSP)]	25	NA
Particulate Matter (PM_{10})	15	10, 24-hour
Nitrogen Dioxide	40	14, annual
Carbon Monoxide	100	575, 8-hour
Volatile Organic Compounds (Ozone)	40	100 TPY[b]
Lead	0.6	0.1, 3-month
Sulfuric Acid Mist	7	NM
Total Fluorides	3	0.25, 24-hour
Total Reduced Sulfur	10	10, 1-hour
Reduced Sulfur Compounds	10	10, 1-hour
Hydrogen Sulfide	10	0.2, 1-hour
Mercury	0.1	0.25, 24-hour
MWC Organics	3.5×10^{-6}	NM
MWC Metals	15	NM
MWC Acid Gases	40	NM
MSW Landfill Gases	50	NM

Note: Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is less than *de minimis* monitoring concentrations.

NA = Not applicable.
NM = No ambient measurement method established; therefore, no *de minimis* concentration has been established.
$\mu g/m^3$ = micrograms per cubic meter.
MWC = Municipal waste combustor
MSW = Municipal solid waste

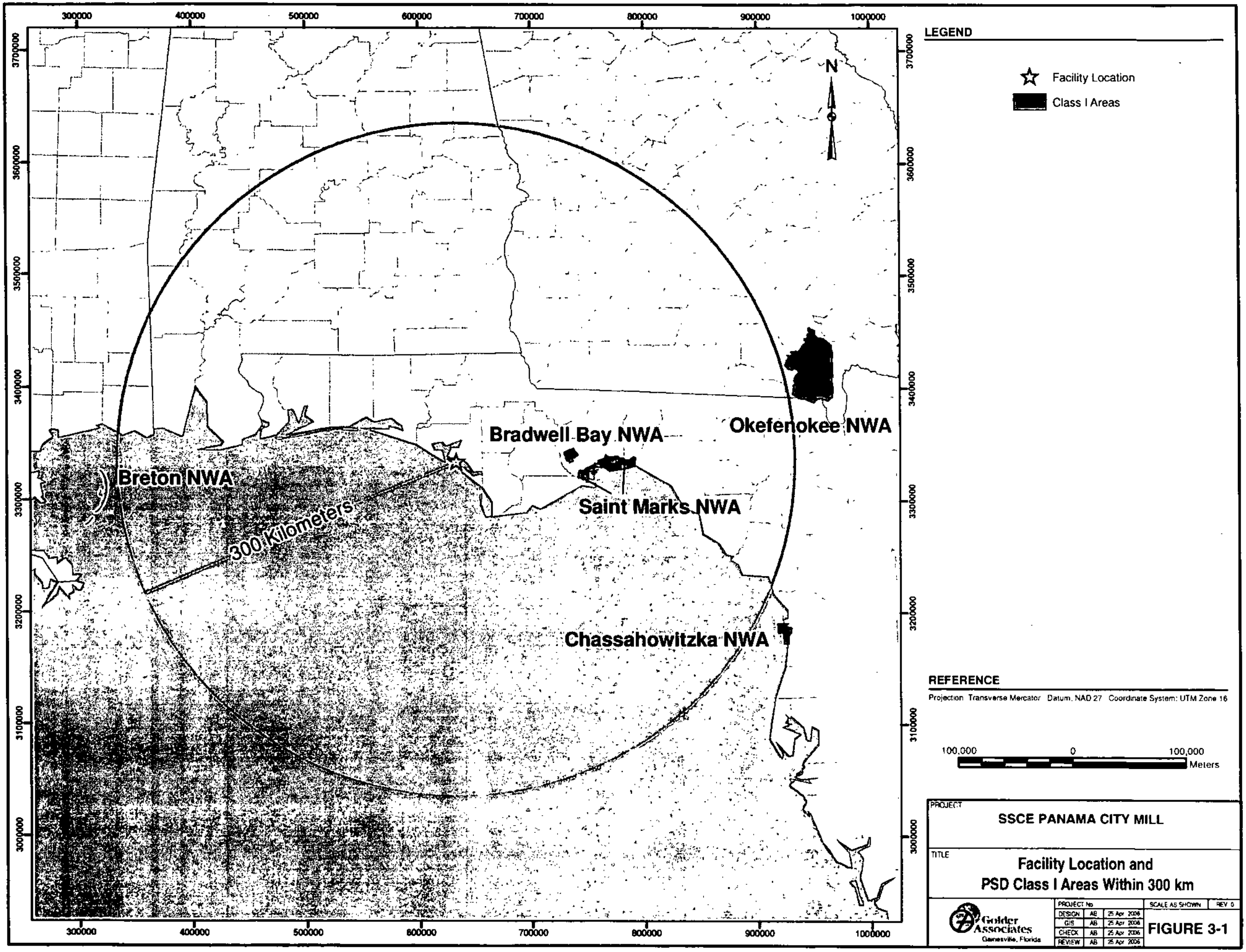
[a] Short-term concentrations are not to be exceeded.
[b] No *de minimis* concentration; an increase in VOC emissions of 100 TPY or more will require a monitoring analysis for ozone.

Sources: 40 CFR 52.21.
Rule 62-212.400, F.A.C.

TABLE 3-3
PSD CONTEMPORANEOUS AND PROJECT EMISSIONS NETTING ANALYSIS
LIME KILN PETCOKE PROJECT, SSCE PANAMA CITY

Source Description	Pollutant Emission Rate (TPY)										
	SO_2	NO_x	CO	PM	PM_{10}	VOC	TRS	SAM	Lead	Mercury	Fluoride
Projected Actual Emissions											
Lime Kiln Petcoke Project											
Lime Kiln[a]	103.0	369.1	14.4	111.4	94.3	3.66	15.6	7.57	0.25	4.93E-05	--
Petcoke Storage Silo[b]	--	--	--	0.60	0.60	--	--	--	--	--	--
Petcoke Truck Traffic[c]	--	--	--	1.27	0.25	--	--	--	--	--	--
Total - Projected Actual	103.0	369.1	14.4	113.3	95.2	3.66	15.6	7.57	0.25	4.93E-05	--
Baseline Actual Emissions											
Lime Kiln[d]	22.8	184.2	14.4	97.1	85.0	3.66	10.3	1.67	0.25	4.93E-05	--
Total - Past Actual	22.8	184.2	14.4	97.1	85.0	3.66	10.3	1.67	0.25	4.93E-05	--
Increase Due to Project	80.3	184.9	0.0	16.6	10.2	0.00	5.3	5.90	0.00	0.00E+00	0.00
PSD SIGNIFICANT EMISSION RATE	40	40	100	25	15	40	10.0	7	0.6	0.1	3
Netting Triggered?	Yes	Yes	No	No	No	No	No	No	No	No	No
CONTEMPORANEOUS EMISSION CHANGES[h]											
Pulp Production Increase (09/2002)											
(Permit No. 0050009-005-AC)											
Increase Due to Increased Pulp Production	-	-	-	-	-	-	-	-	-	-	
- Decrease Due to Existing Pulp Production	-	-	-	-	-	-	-	-	-	-	--
Net Change	-	-	-	-	-	-	-	-	-	-	--
Smelt Dissolving Tanks/MACT II (11/2003)											
(Permit No. 0050009-007-AC)											
--Increase Due to Future MACT I Sources	0.0	0.0	-	-	-	-	-	-	-	-	
- Decrease Due to Existing Sources	0.0	0.0	-	-	-	-	-	-	-	-	--
--Net Change	0.0	0.0	-	-	-	-	-	-	-	-	
MACT I Compliance: Update NOx Emissions (7/2003)											
(Permit Nos. 0050009-006-AC and -010-AC)											
--Increase Due to Future MACT I Sources	0.0	118.1	-	-	-	-	-	-	-	-	--
- Decrease Due to Existing Sources	0.0	0.0	-	-	-	-	-	-	-	-	--
--Net Change	0.0	118.1[f]	-	-	-	-	-	-	-	-	--
Methanol Storage Tank (4/2003)											
(Permit No. 0050009-012-AC)	0.0	0.0	-	-	-	-	-	-	-	-	--
No. 3/No. 4 Comb. Boiler Misc. Amendments (6/2003)											
(Permit No. 0050009-013-AC)	0.0	0.0	-	-	-	-	-	-	-	-	--
Woodyard Rate Correction (6/2003)											
(Permit No. 0050009-014-AC)	0.0	0.0	-	-	-	-	-	-	-	-	--
Lime Kiln Fuel Modification (10/2003)											
(Permit No. 0050009-015-AC)	0.0	0.0	-	-	-	-	-	-	-	-	--
Bleach Plant Softwood Increase (6/2004)											
(Permit No. 0050009-018-AC)											
--Increase Due to Future Bleach Plant	0.0	0.0	-	-	-	-	-	-	-	-	--
--Decrease Due to Existing Bleach Plant	0.0	0.0	-	-	-	-	-	-	-	-	-
--Net Change	0.0	0.0	-	-	-	-	-	-	-	-	-
Clean Condensate Alternative Project (6/2005)											
(Permit No. 0050009-016-AC)											
--Increase Due to Future CCA Sources	1,976.6	164.0	-	-	-	-	-	-	-	-	--
--Decrease from Existing CCA Sources	-	66.9	-	-	-	-	-	-	-	-	-
--Net Change	1,976.6[e]	97.1[e]	-	-	-	-	-	-	-	-	-
No. 4 Combination Boiler (11/2005)											
(Permit No. 0050009-021, -022-AC)											
--Increase Due to Future No. 4 CB	0.0	0.0	-	-	-	-	-	-	-	-	--
--Decrease from Existing No. 4 CB	0.0	0.0	-	-	-	-	-	-	-	-	
--Net Change	0.0	0.0	-	-	-	-	-	-	-	-	
No. 3 Combination Boiler (5/2006)											
(Permit No. 0050009-023-AC)											
--Future Actuals	3,885.1	476.8	-	-	-	-	-	-	-	-	-
--Past Actuals	-3,885.1	-458.9	-	-	-	-	-	-	-	-	--
Net Change	0.0	17.9	-	-	-	-	-	-	-	-	-
Stripper Off-Gas to No. 4 CB (4/2006)											
(Permit No. 0050009-024-AC)											
--Increase Due to Future No. 3/No. 4 CB	0.0	0.0	-	-	-	-	-	-	-	-	--
--Decrease from Existing No. 3/No. 4 CB	0.0	0.0	-	-	-	-	-	-	-	-	--
--Net Change	0.0	0.0	-	-	-	-	-	-	-	-	--
Total Contemporaneous Emission Changes		17.9	-	-	-	-	-	-	-	-	[illegible]
TOTAL NET CHANGE	80.3	202.7	0.0	16.6	10.2	0.00	5.3	5.90	0.00	0.00	0.00
PSD SIGNIFICANT EMISSION RATE	40	40	100	25	15	40	10.0	7	0.6	0.1	3
PSD REVIEW TRIGGERED?	Yes	Yes	No	No	No	No	No	No	No	No	No

Footnotes:
[a] See Table 2-2 for projected actual emissions calculations for the Lime Kiln.
[b] Based on 2,000 acfm, and 0.004 gr/acf.
[c] Based on calculation in AP-42, Section 13.2.1, for particulate emissions from paved roads, December 2003.
[d] See Table 2-1 for baseline actual emissions from the Lime Kiln.
[e] Pollution Control Project (PCP). Pollutants which triggered PSD review were exempted under the PCP.
[f] Denotes that PSD review was triggered for this pollutant, therefore this, and any previous contemporaneous increases/decreases, are wiped clean.
[g] Since project increase does not exceed PSD significant emission rate, netting is not performed for this pollutant.
[h] The contemporaneous period begins 5 years prior to the projected date of commencement of construction on the Lime Kiln project, which is fall of 2007.



Okefenokee NWA
Bradwell Bay NWA
Breton NWA
Saint Marks NWA
300 Kilometers
Chassahowitzka NWA
N
LEGEND
Facility Location
Class I Areas
REFERENCE
Projection: Transverse Mercator Datum: NAD 27 Coordinate System: UTM Zone 16
100,000 0 100,000
Meters
PROJECT
SSCE PANAMA CITY MILL
TITLE
Facility Location and
PSD Class I Areas Within 300 km
Golder Associates
Gainesville, Florida
FIGURE 3-1

4.0 AMBIENT MONITORING ANALYSIS

4.1 Monitoring requirements

In accordance with requirements of 40 CFR 52.21(m) and Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a major modification, the pollutants are those for which the net emissions increase exceeds the significant emission rate (see Table 3-2). As discussed in Section 3.4.2.1, SO_2 and NO_X are subject to PSD pre-construction monitoring requirements for the proposed modification because the net increase in emissions due to the project exceeds the PSD significant emission rate for these pollutants.

Ambient air monitoring for a period of up to 1 year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (1987).

An exemption from the pre-construction ambient monitoring requirements is also available if certain criteria are met. If the predicted increase in ambient concentrations, due to the proposed modification, is less than specified *de minimis* concentrations, then the modification can be exempted from the pre-construction air monitoring requirements for that pollutant.

The PSD *de minimis* monitoring concentration for SO_2 is 13 $\mu g/m^3$ as a 24-hour average, and for NO_2 is 14 $\mu g/m^3$ as an annual average. The predicted increase in SO_2 concentrations due to the proposed project is 31 $\mu g/m^3$, 24-hour average, as presented in Section 6.0. Since the predicted increase in SO_2 impacts due to the proposed project is greater than the *de minimis* monitoring concentration level, a pre-construction air monitoring analysis is required for SO_2. The analysis is presented in Section 4.2.

The predicted increase in NO_2 concentrations due to the proposed projects is 4.6 $\mu g/m^3$, annual average, as presented in Section 6.0. Since the predicted increase in NO_2 impacts due to the proposed project is less than the *de minimis* monitoring concentration level, a pre-construction air monitoring analysis is not required for NO_2. Nevertheless, existing ambient monitoring data for NO_2 is presented in Section 4.3, in order to support the air impact analysis presented in Section 6.0. The data are used to estimate "background" air quality concentrations. "Background" concentrations are ambient concentrations that are due to sources other than those sources specifically included in the modeling analysis. These sources include distant major sources, minor sources, area sources, and natural sources.

4.2 SO_2 Ambient Monitoring Analysis

A summary of the existing ambient SO_2 data for monitors located in the vicinity of the SSCE Panama City Mill is presented in Table 4-1. Data are presented for 2004 – 2006. There were no existing monitoring stations within close proximity of the Panama City Mill. There are three stations in the state of Florida within 300 km of the Panama City Mill. These stations consist of two in Pensacola located to the west of Panama City, and one in Hamilton County located to the east-northeast. The monitoring facilities in Pensacola were not considered in the analysis, as they are heavily influenced by nearby point sources, and so would not be representative of the ambient conditions around the Panama City Mill. The monitoring station in Hamilton County, although potentially influenced by a major point source of emissions (PCS Phosphates), was selected for this analysis because the SO_2 data appear to be reflective of background concentrations.

The Hamilton County monitor shows that all of the ambient SO_2 concentrations were below the AAQS of 1,300 $\mu g/m^3$, maximum 3-hour average; 260 $\mu g/m^3$, maximum 24-hour average; and 60 $\mu g/m^3$, annual average. For purposes of an ambient SO_2 background concentration for use in the modeling analysis, the highest of the second-highest 3-hour and 24-hour and the highest annual average concentrations occurring over the 3-year period from the Hamilton County, County Road 137, monitoring station, the monitor most closely representative of the Panama City area, were selected. These concentrations are 69, 24 and 4.8 $\mu g/m^3$ for the 3-hour, 24-hour and annual averages, respectively.

4.3 NO_2 Ambient Monitoring Analysis

Background NO_2 concentrations must be estimated to account for NO_2 sources, which are not explicitly included in the atmospheric dispersion modeling analysis. To estimate reasonable background NO_2 concentrations, a review of recent, available NO_2 monitoring data in the area of SSCE Panama City was performed. A summary of ambient NO_2 data available for 2004 – 2006 is presented in Table 4-2. There were no monitoring stations within close proximity of the Panama City Mill. The two closest monitoring facilities are located in Pensacola and Jacksonville. The Pensacola monitoring station was chosen as the closest monitor to the Panama City Mill.

The monitoring station shows that ambient NO_2 annual average concentrations were well below the AAQS of 100 $\mu g/m^3$. For purposes of an ambient NO_2 background concentration modeling analysis, the highest annual average concentration occurring over the 3-year period was selected. This concentration is 13.6 $\mu g/m^3$, measured in Pensacola. This background is conservatively high, since it is impacted by major nearby point sources. This monitor is also impacted significantly by vehicular traffic in the Pensacola area.

TABLE 4-1
SUMMARY OF SO_2 MONITORING DATA COLLECTED NEAR SSCE, PANAMA CITY FACILITY

County	Station ID	Monitor Location	Year	Number of Observations	Reported Concentration (ug/m^3) Highest 24-Hour	Second Highest 24-Hour	Highest 3-Hour	Second Highest 3-Hour	Annual
Hamilton	12-047-0015	County Road 137 at entrance to Oxy SRCC	2006	6216	16	11	29	29	3.5
			2005	8451	24	19	74	66	4.5
			2004	8634	29	24	69	69	4.8

Source: US EPA Air Quality System Quick Look Report, 2004 through 2006.

TABLE 4-2
SUMMARY OF NO_2 MONITORING DATA COLLECTED NEAR SSCE, PANAMA CITY FACILITY

					Reported Concentration (ug/m^3)		
County	Station ID	Monitor Location	Year	Number of Observations	Highest 1-Hour	Second Highest 1-Hour	Annual
Escambia	12-033-0004	Pensacola, Ellyson Industrial Park-Cooper RD	2006	6369	76	73	9.2
			2005	8518	84	76	11.1
			2004	8605	80	78	13.6

Source: US EPA Air Quality System Quick Look Report, 2004 through 2006.

5.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

5.1 Requirements

The 1977 CAA Amendments established requirements for the approval of pre-construction permit applications under the PSD program. As discussed in Section 3.2.2, one of these requirements is that BACT be installed for applicable pollutants. BACT determinations must be made on a case-by-case basis considering technical, economic, energy, and environmental impacts for various BACT alternatives. To bring consistency to the BACT process, the EPA developed the "top-down" approach to BACT determinations.

The first step in a top-down BACT analysis is to determine, for each applicable pollutant, the most stringent control alternative available for a similar source or source category. If it can be shown that this level of control is not feasible on the basis of technical, economic, energy, or environmental impacts for the source in question, then the next most stringent level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy, or environmental consideration.

In the case of the proposed project, only the Lime Kiln is being physically modified. As a result, BACT only applies to the Lime Kiln. SO_2 and NO_X emissions from the Lime Kiln require a BACT analysis. The BACT analysis is presented in the following sections.

5.2 Nitrogen Oxides (NO_x)

5.2.1 Proposed Control Technology

NO_x emissions are proposed to be controlled through use of a low-NO_x burner especially designed to burn petcoke/gas/oil, efficient operation, good combustion practices, and preventative maintenance of the Lime Kiln. Maximum potential NO_x emissions from the Lime Kiln are expected to be 185 ppmvd at 10 percent O_2 when firing the maximum amount of petcoke, or 107.8 lbs/hr and 472.3 TPY, while projected actual emissions are 87.8 lbs/hr and 384.5 TPY.

5.2.2 BACT Analysis

Previous BACT Determinations

As part of the BACT analysis, a review was performed of previous NO_x BACT determinations for lime kilns listed in the RACT/BACT/LAER Clearinghouse (RBLC) on EPA's web page. A summary of the BACT determinations for lime kilns from this review is presented in Table 5-1. The NO_x emission limits for lime kilns identified in the RBLC search range from 100 to 340 ppmvd at 10 percent O_2, and from 21.8 to 95.6 lb/hr. This rather large range of emissions is due to differences in lime kiln design and operation, as well as differences in fuel type. The lower BACT emission limits were for natural gas firing.

Only one BACT determination was identified as pertaining to petcoke firing. This is also the most recent BACT determination – for Weyerhaeuser Co. Red River Mill. The BACT limit for NO_x was set at 190 ppmvd at 10 percent O_2.

From the review of previous determinations, as shown in Table 5-2, it is evident that all NO_x BACT determinations for lime kilns have been based on good combustion practices, *i.e.*, no add-on control equipment.

Control Technology Feasibility

The potentially feasible NO_x controls for the Lime Kiln are shown in Table 5-3. As shown, there are seven possible technologies for the control of NO_x from the lime kiln. Each available technique was listed with its associated efficiency estimate, identified as feasible or infeasible, and ranked based on control efficiency. SSCE believes that good combustion control, preventative maintenance, and efficient operation are the only technologies that are technically feasible for NO_x emissions.

Potential Control Method Descriptions

Oxidation/Reduction Scrubbing (O/R)

Several proprietary add-on NO_x removal processes are commercially available, such as Tri-Mer Corporation's TRI-NO_X and The BOC Group's $LoTO_x$ (Low Temperature Oxidation) NO_x control system. It has been reported that O/R scrubbing has a theoretical NO_x removal efficiency of 90 percent. The basic elements of the system are:

1. Cooling of the gas stream to its dew point temperature, which condenses a portion of the water vapor in the gas and generates condensate that requires disposal;
2. Low temperature oxidation of the NO_x, CO and SO_2 to higher oxides through controlled injection of ozone or sodium chlorite in a static mixer or reaction duct; and
3. Absorption of higher vapor forms of nitrogen and sulfur oxides in a wet scrubber that produces nitric, sulfuric, and carbonic acid solution. These acids must be recovered and neutralized by the use of sodium hydroxide in the scrubber water (caustic scrubbing).

The ability of the O/R Scrubbing System to perform on a lime kiln or a similar source has never been demonstrated. The presence of carbon dioxide from both calcination and combustion is also a complicating factor. Furthermore, the technology is not listed for lime kilns in the RBLC. For all of the reasons listed above, O/R Scrubbing is considered technically infeasible for the Lime Kiln.

Selective Catalytic Reduction (SCR)

SCR is an exhaust gas treatment process in which ammonia (NH_3) or urea is injected into the exhaust gas, which then passes through a catalyst bed. The NH_3 reacts to form nitrogen (N_2) and water on the surface of the catalyst. The overall chemical reaction is represented by the following equation:

$$NH_3 + NO + 1/4\ O_2 \rightarrow N_2 + 3/2\ H_2O$$

In the SCR process, urea or NH_3 from a liquid storage tank is vaporized and injected into the flue gas prior to the catalyst. The flue gas/ammonia mixture then passes over the catalyst. The catalyst acts to lower the activation energy of the NO decomposition reaction, therefore, lowering the temperature necessary to carry out the reaction.

Several technical and operational difficulties exist with SCR technology as applied to lime kilns. The SCR process is temperature sensitive, and efficient operation requires flue gas temperatures to be within a narrowly defined range. Load fluctuations can result in exhaust gas temperature fluctuations which upset the NH_3/NO_x molar ratio, in turn affecting removal efficiency. A lower than necessary temperature results in slow reaction rates, which leads to low NO_x conversion rates, as well as unreacted NH_3 passing through the reactor bed (ammonia slip). A higher temperature than necessary results in shortened catalyst life and can lead to the oxidation of NH_3 and the formation of additional NO_x.

The catalytic reaction can result in NO_x removal efficiencies between 60 and 90 percent under ideal conditions. SCR technology has not been applied to lime kilns due to the variable exhaust temperatures associated with the process. Furthermore, the optimum temperature range for the catalytic reaction is 575°F to 750°F. A lime kiln typically operates in the 1,600 – 2,700 °F range.

Additional concerns with using a SCR system include the hazards involved with storing large quantities of NH_3 and with disposal of spent catalyst.

The NH_3 also causes potential corrosion problems, and unreacted ammonia may also react with sulfur to form ammonium bisulfate, which has the potential to create a visible and/or detached plume. The lime in the Lime Kiln may also react with the sulfur to form calcium sulfate. Ammonium bisulfate and calcium sulfate coatings, along with other dusts, will block the catalyst pores, thereby reducing the catalyst effectiveness.

An SCR unit could potentially be placed downstream of the wet scrubber to alleviate the catalyst blockage problem; however, the flue gas is approximately 170°F and would require a heat exchanger (*i.e.*, an additional gas-fired duct burner) system to achieve the desired reaction temperature of greater than 575°F.

SCR technology is not listed for lime kilns in the RBLC. SCR is not considered to be technically feasible for controlling NO_x emissions from the Lime Kiln.

Selective Non-Catalytic Reduction (SNCR)

SNCR is similar to SCR except without the catalyst to enhance the reactions. In SNCR, urea or ammonia is injected into the flue gas at a point where the flue gas is between 1,600°F and 2,100°F. The reaction between NH_3 and NO_x to form N_2 and water is represented by the following equation.

$$NH_3 + NO + 1/4\ O_2 \rightarrow N_2 + 3/2\ H_2O$$

In this process, urea or NH_3 from a liquid storage tank is vaporized and injected into the flue gas.

Several difficulties preclude use of an SNCR system for control of NO_x emissions from a lime kiln. These include maintaining proper temperature window, maintaining the correct NH_3/NO_x ratio during any load fluctuations, ammonia slip and resulting formation of ammonium salts. These salts can result in a visible plume.

Due to load and exhaust gas temperature fluctuations, optimum NH_3/NO_x molar ratio, as well as correct reaction temperatures, would be extremely difficult to monitor and maintain, and release of NH_3 into the atmosphere can occur. The correct temperature window of 1,600°F to 2,100°F occurs inside the rotating body of the kiln. Locating injection nozzles in such an area is not technically feasible at the present time and has not been attempted on any lime kiln.

SNCR has never been demonstrated on a lime kiln and is not listed in the RBLC. For all of the above reasons, SNCR is considered a technically infeasible control technology for the Lime Kiln.

Low NO_x Burners (LNB)

Traditional burners in a lime kiln are designed to introduce the fuel and air into a single combustion zone. With this arrangement, to obtain optimal flames, large amounts of excess air must be introduced. This results in a relatively uncontrolled combustion condition and high flame temperatures. The high flame temperatures create thermal NO_x. LNB technology stages combustion at the burner in the high temperature zone of the flame to control the generation of thermal NO_x,

In a LNB, the first stage is a fuel-rich, oxygen-lean atmosphere where little oxygen is available for NO_x formation. This reduces peak flame temperatures by delaying the completion of the combustion process. Combustion is then completed in the second stage, where excess air is available, but temperatures are lower than at the hottest portion of the flame.

LNBs have been extensively tested and used in utility and industrial boilers, and this technology has been transferred to lime kilns to the extent possible. Burner flame properties are critical to the quality control and calcining process in the lime kiln. The burner flame shape and properties have a dramatic effect on calcining efficiency. Poor efficiency increases energy usage and decreases the calcining capacity of the kiln. The modern lime kiln burner incorporates feature to stage the combustion and lower the peak flame temperature, although these burners are not typically referred to as "low-NO_x".

The State of Georgia issued a BACT determination in 2003 for the Weyerhaeuser Mill stated that there are no commercially available LNBs on the market for a lime kiln application. However, the

SSCE Panama City Lime Kiln will utilize the very latest in burner design to minimize NO_x emissions from the Lime Kiln.

Flue Gas Recirculation (FGR)

In FGR, a portion of the flue gases are recirculated back to the primary combustion chamber to create a lower oxygen content atmosphere. This oxygen-lean atmosphere provides less O_2 available for NO_x formation. Due to the lower temperature of the recirculated gases, peak flame temperature is lowered. Therefore, FGR reduces both fuel and thermal NO_x.

However, there exist major barriers to using FGR in a lime kiln. These include reducing the peak flame temperature below the temperature necessary for proper lime formation, and a long and lazy flame would be produced, which is not acceptable for ensuring fully calcined lime. FGR would also require an excessive amount of ducting from the kiln outlet back to the kiln inlet.

FGR has never been demonstrated on a lime kiln and is considered a technically infeasible control technology for the Lime Kiln.

Non-Selective Catalytic Reduction (NSCR)

NSCR is another exhaust gas treatment technique for NO_x reduction which uses a catalyst, typically a platinum/rhodium catalyst. Use of NSCR reduces emissions of NO_x, CO, and VOC simultaneously across the catalyst bed. It is only effective in fuel rich combustion air. To achieve a fuel-rich environment, excess combustion air must be kept to a minimum, resulting in a flue gas with less than three percent O_2 by volume ideally (the O_2 content should be less than half a percent by volume for proper operation).

The Lime Kiln at Panama City will normally operate with stack exhaust gas O_2 concentrations above 5 percent (by volume). Decreasing the excess air, and thus the O_2 concentrations, would result in increased CO emissions. In addition to the operational incompatibility of the control strategy, various problems will arise from the fuel-borne contaminants which cause catalyst fouling (dust, SO_2, and Cl_2 in the flue gas can poison the catalyst), excessive backpressure, plugging of the catalyst, and efficiency reduction. For all of the reasons mentioned above, NSCR is technically infeasible for the Lime Kiln.

Good Combustion Practices (GCP)

GCP, such as proper kiln design and operation, minimize the formation of NO_x. Emissions are minimized when the lime kiln temperature is kept at the lower end of the desired range and when the distribution of air at the burner (air and fuel injection zones) is controlled. Maintaining a low-oxygen condition at the fuel injection points simulates a staged combustion process. Also, higher thermal efficiency would lead to less consumption of heat and fuel and would produce less NO_x emissions. General improvement in thermal efficiency is one design method of reducing NO_x formation, since less fuel is used. Since this technology is technically feasible, good combustion practices are proposed for the Lime Kiln.

Environmental Impacts

The maximum predicted NO_2 impacts for the proposed project alone is below the EPA Class II significant impact level, and well below the EPA Class I significant impact level. Additional NO_x controls would result in an insignificant reduction of ambient impacts that are already below the EPA significance level for Class I areas. SSCE proposes BACT based on good combustion practices and proper burner design and operation in order to further minimize impacts in the Class II areas.

5.2.3 BACT Selection

The only feasible control technologies for NO_x control in the Lime Kiln are burner design and operation, good combustion practices, preventative maintenance, and efficient operation of the lime kiln. The Lime Kiln will employ these control techniques at the SSCE Panama City Mill. SSCE is considering the use of a Coen petcoke/oil/gas burner for the Lime Kiln project (see Appendix C). The burner is designed to fire up to 90 percent petcoke with either oil or gas. The burner is of proven design and uses dual (two) air zones for better flame shaping, low flame temperatures, and high energy efficiency. The burner incorporates a "spinner", which imparts a spin to the combustion air and creates a recirculation zone.

5.3 Sulfur Dioxide

5.3.1 Previous BACT Determinations

As part of the BACT analysis, a review was performed of previous SO_2 BACT determinations for lime kilns listed in the RACT/BACT/LAER Clearinghouse (RBLC) on EPA's web page. A summary of the BACT determinations for lime kilns from this review is presented in Table 5-5. The SO_2 emission limits for lime kilns identified in the RBLC search range from 20 to 70 ppmvd at 10 percent

O_2, and from 2.59 to 41.6 lb/hr. This rather large range of emissions is due to differences in lime kiln design and operation, as well as differences in fuel, which indicates that the chosen limits are mill-specific.

Only one BACT determination was identified as pertaining to petcoke firing. This is also the most recent BACT determination – for Weyerhaeuser Co. Red River Mill. The BACT limit for SO_2 was set at 70 ppmvd at 10 percent O_2, based on a combination of flue gas desulfurization, proper kiln design and operation, and optimized mud washing.

From the review of previous determinations, as shown in Table 5-5, it is evident that all SO_2 BACT determinations for lime kilns have been based on a combination of control methods.

5.3.2 Control Technology Feasibility

The potentially feasible SO_2 controls for the Lime Kiln are shown in Table 5-6. As shown, there are four possible technologies for the control of SO_2 from the Lime Kiln. Each available technique was listed with its associated efficiency estimate, identified as feasible or infeasible, and ranked based on control efficiency. SSCE believes that all of these technologies are feasible, except for the use of low sulfur fuels. The use of low sulfur fuel is not an option since SSCE is requesting the ability to burn high sulfur petcoke in the Lime Kiln.

5.3.3 Potential Control Method Descriptions

Lime muds contain a small amount of sulfur that forms SO_2 when oxidized in the kiln. SO_2 is also formed in lime kilns when fuel oil or petroleum coke is burned as primary fuel. Finally, SO_2 is also formed when non-condensable gases (NCGs) or stripper off-gases (SOGs) containing sulfur are burned in the kiln. NCASI reports the median sulfur content of concentrated NCGs and SOGs as containing 1.1 and 4.2 lb/ADTP (air dried ton pulp), respectively, and lime mud median sulfur contents as 0.2 percent, which translates to about 1.8 lb S/ADTP. Thus, fossil fuels such as fuel oil, kraft mill NCG/SOGs, and soluble sulfides in lime mud can contribute a significant amount of sulfur to the lime kiln input.

However, the regenerated quicklime in the kiln acts as a highly efficient scrubbing agent, and a significant amount of the SO_2 is absorbed into the lime. A venturi scrubber following the kiln can further decrease SO_2 removal because the scrubbing solution becomes highly alkaline from the captured lime dust. NCASI reports that, even though the potential for SO_2 formation in a kiln that burns sulfur-containing fuels with or without NCGs/SOGs is high, most lime kilns emit very low levels of SO_2 (~50 ppm). Some kilns do, however, occasionally emit higher levels of SO_2 (50 to 200 ppm). The specific reasons for this are not known.

NCASI also reports, and is confirmed by Table 5-4, that emission test data show that SO_2 concentrations do not appear to be related to either the fuel type (oil, gas) or the presence or absence of concentrated NCG or SOG burning in the kiln. A preliminary sulfur input-output balance carried out on 25 kilns with wet scrubbers and 7 kilns with electrostatic precipitators (ESPs), with sulfur inputs from fuel oil, NCGs and SOGs, or just lime mud, showed over 95 percent of the SO_2 generated from the oil, NCG/SOGs, or lime mud was captured within the kiln. For kilns with wet scrubbers (majority) that have high SO_2 emissions, alkali addition to the scrubbing fluid could further reduce the SO_2 emissions.

SSCE has identified one add-on control technologies and two pollution prevention techniques. The technical feasibility of each of these control approaches is discussed in the following paragraphs.

Flue Gas Desulfurization/Wet Scrubbers

Flue gas desulfurization (FGD) systems are collection devices that absorb SO_2 into an absorbent in order to remove them from a gas stream. FGD systems generally use a liquid absorbent as the scrubbing media, although dry sorbents can also be employed by injecting them into the flue gas stream. Water usage, wastewater disposal, and solid waste disposal requirements are important factors in the evaluation of a FGD alternative.

Wet scrubbers are collection devices that trap wet particles in order to remove them from a gas stream. They utilize inertial impaction and/or Brownian diffusion as the particle collection mechanism. Wet scrubbers generally use water as the cleaning liquid, but caustic or lime can be added for pH control in order to remove SO_2 from the gas stream. Water usage and wastewater disposal requirements are important factors in the evaluation of a scrubber alternative. Types of scrubbers include spray scrubbers, cyclone scrubbers, packed-bed scrubbers, plate scrubbers, and venturi scrubbers. The most common scrubber is the venturi scrubber because of its simplicity (no moving parts) and high collection efficiency. In this type of scrubber, a gas stream is passed through a venturi section, before which, a low-pressure liquid (usually water) is added to the throat. The liquid is atomized by the turbulence in the throat and begins to collect pollutants impacting the liquid

The Lime Kiln at the Panama City Mill is currently equipped with a venturi scrubber followed by a cyclonic collector. The venturi scrubber primarily uses fresh water as the scrubbing media. Although not designed as an SO_2 control device, the venturi scrubber acts as a highly efficient SO_2 scrubber by virtue of the fact that the scrubber collects lime dust particles which exit the Lime Kiln in the flue gases. This renders the scrubbing liquid as highly alkaline, and the venturi scrubber in essence becomes an FGD system using a lime slurry as the scrubbing media. Two emission tests have been conducted on the Lime Kiln for SO_2. Each test has demonstrated very low emissions (5.6 lb/hr and 0.5 lb/hr) while burning high sulfur (2.4 percent S) No. 6 fuel oil. This demonstrates the venturi scrubber system is nearly 100 percent efficient in removing SO_2 from the flue gas.

Optimal Mud Washing

Beyond the use of a FGD system, some sulfur removal (and therefore SO_2 removal) would be expected with optimal lime mud washing. By filtering and washing soluble sodium and sulfur compounds from the lime mud, ball and ring formation is minimized in the lime kiln, as well as SO_2, TRS, and SAM emissions. These technologies, both individually and combined, are effective in the removal of sulfur compounds in general.

SSCE practices effective lime mud washing techniques on the Lime Kiln. The lime mud is washed as thoroughly as possible, using fresh water. The solids off of the mud filter are tested on a regular basis, the amount of vacuum is monitored and recorded, and the filter is cleaned regularly with acid.

Proper Kiln Design and Operation

The emission of SO_2 from a lime kiln is minimized by employing proper kiln design and operation, which is synonymous with good combustion practices, which ensures that SO_2 in the flue gas can readily absorb into the lime. Efficient combustion is a function of several parameters, including the quantity of oxygen supplied in the burner to support combustion of the fuel and the temperature and residence time inside the kiln to which the products of fuel combustion are exposed. Good combustion control practices manage the process to maintain a consistent level of SO_2 absorption within the kiln. Employing good combustion practices is a technically feasible manner in which to control emissions of SO_2.

Use of Low Sulfur Fuels

The proposed project will enable the Lime Kiln to fire fuel with a higher sulfur fuel than the present fuel. Thus, the project cannot technically include lower sulfur fuels as a control option.

5.3.4 BACT Selection

The only feasible control technologies for SO_2 control in the Lime Kiln are flue gas desulfurization, proper kiln design and operation (good combustion practices/controls) and optimal mud washing. The Lime Kiln will employ these control techniques at the SSCE Panama City Mill. Maximum SO_2 emissions from the Lime Kiln are proposed at 0.183 lb/MMBtu, 32.9 lb/hr and 144.3 TPY when firing petcoke.

TABLE 5-1
SUMMARY OF BACT DETERMINATIONS FOR NITROGEN OXIDE EMISSIONS FROM LIME KILNS

Company Name	ST	Permit No. / RBLC ID	Permit Issue Date	Emission Unit	Throughput	Fuel	Emission Limit ppm	lb/hr	TPY	lb/ton CaO	Control Equipment
Weyerhaeuser Co. - Red River Mill	LA	PSD-LA-562(M-2)	5/24/2006	Lime Kiln No. 2	93 MMBtu/hr	Natural Gas	190.0 @ 10% O_2	--	--	--	Proper Kiln Design and Optimized Combustion Practices
					80 MMBtu/hr	Petroleum Coke	190.0 @ 10% O_2	--	--	--	Proper Kiln Design and Optimized Combustion Practices
Georgia Pacific Corp. - Monticello Mill	MS	1500-00007	3/3/2005	Lime Kiln	146 MMBtu/hr	Natural Gas & NCGs	--	95.6	418.5	--	Good Combustion
Pope & Talbot, Inc. - Halsey Pulp Mill	OR	22-0033	1/22/2004	Lime Kiln	78,320 TPY CaO	Natural Gas	112.0 @ 10% O_2 (3-hr avg)	--	241	--	Good Combustion Control
Georgia Pacific Corp. - Monticello Mill	MS	1500-00007	7/9/2003	Lime Kiln	200 MMBtu/hr	Natural Gas & NCGs	--	95.6	418.5	--	Good Combustion Practices and Kiln Design
Weyerhaeuser Co. - Flint River Operations	GA	2631-193-0013-V-01-1	5/28/2003	Rotary Lime Kiln	370 TPD	No. 6 Fuel Oil	175 @ 10% O_2	--	--	--	--
Georgia Pacific Corp. - Port Hudson Operations	LA	PSD-LA-581 (M-2)	1/25/2002	Lime Kiln No. 1	340 TPD	--	--	48.78	213.66	--	Good Equipment Design and Proper Combustion Techniques
				Lime Kiln No. 2	340 TPD	--	--	38.75	169.74	--	Good Equipment Design and Proper Combustion Techniques
Longview Fiber Company	WA	PSD-01-03	12/10/2001	Lime Kilns 1 & 2	140 TPD CaO each	--	340 @ 10% O_2 (24-hr avg)	--	139	--	--
				Lime Kiln 3	240 TPD CaO	--	340 @ 10% O_2 (24-hr avg)	--	238	--	--
				Lime Kiln 4	250 TPD CaO	--	340 @ 10% O_2 (24-hr avg)	--	248	--	--
				Lime Kiln 5	325 TPD CaO	--	275 @ 10% O_2 (24-hr avg)	--	262	--	--
Bowater - Bowater Coated Paper Division	SC	2400-0005-CO-CT	10/31/2001	Lime Kiln No. 2	-- --	No. 6 Fuel Oil	152 @ 10% O_2	--	--	--	--
Donahue Industries, Inc. - Paper Mill	TX	PSD-TX-437	10/17/2000	Lime Kiln	-- --	Natural Gas & No. 2 Fuel Oil	--	22.7	96.7	--	--
Weyerhaeuser Co.	MS	1680-00044	9/10/1996	Lime Kiln	504 TPD CaO	--	300 @ 3.6% O_2	--	--	--	Effective Operation of the Kiln
Buckey Florida, L.P	FL	1230001-004-AC / PSD-FL-232	8/13/1996	Lime Kiln	750 TPD CaO	Natural Gas	--	68.44	--	--	Good Combustion & Burner Modifications
Riverwood International Corp	GA	2631-011-11958	7/11/1996	Lime Kilns 1 & 2	8.4 ton/hr CaO per kiln	--	--	--	--	3.5	Low NO_x Burners
Apple Grove Pulp & Paper Company, Inc.	WV	R14-11	6/17/1996	Lime Kilns (2)	65,600 lb/hr CaO	Natural Gas	100	21.8	--	--	--
Willamette Industries - Marlboro Mill	SC	1680-0043	4/17/1996	Lime Kiln	450 TPD CaO	Natural Gas	175	44.3	194	--	Good Combustion Control

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, December, 2006

TABLE 5-2
SUMMARY OF BACT DETERMINATIONS FOR NITROGEN OXIDE CONTROL IN LIME KILNS LISTED BY THE EPA

Pollutant	Control Technology
NO_x	No Controls
NO_x	Low-NOx Burners
NO_x	Efficient Operation
NO_x	Good Combustion Control
NO_x	Preventative Maintenance
NO_x	Good Equipment Design

TABLE 5-3
NITROGEN OXIDE CONTROL TECHNOLOGY FEASIBILITY ANALYSIS FOR THE LIME KILN, SSCE PANAMA CITY

Nitrogen Oxide Control Technology	Estimated Efficiency	Feasible and Demonstrated? (Y/N)	Rank Based on Control Efficiency	Employed by the lime kiln? (Y/N)
Oxidation/Reduction Scrubbing	90%	N	1	N
Selective Catalytic Reduction	60-90%	N	2	N
Selective Non-Catalytic Reduction	30-50%	N	3	N
Low-NO_x Burners	20-30%	Y	4	Y
Flue Gas Recirculation	15-25%	N	5	N
Non-Selective Catalytic Reduction	Varies	N	NA	N
Good Combustion Control / Preventative Maintenance / Efficient Operation	Varies	Y	NA	Y

Note: NA = Not Applicable

TABLE 5-4
SUMMARY OF BACT DETERMINATIONS FOR SULFUR DIOXIDE EMISSIONS FROM LIME KILNS

Company Name	ST	Permit No. / RBLC ID	Permit Issue Date	Emission Unit	Throughput	Fuel	Emission Limit ppm	Emission Limit lb/hr	Emission Limit TPY	Control Equipment
Weyerhaeuser Co. - Red River Mill	LA	PSD-LA-562(M-2)	5/24/2006	Lime Kiln No. 2	93 MMBtu/hr	Natural Gas	70 @ 10% O_2	--	--	Flue Gas Desulfurization, Proper Kiln Design and Operation, and Optimized Mud Washing
					80 MMBtu/hr	Petroleum Coke	70 @ 10% O_2	--	--	Flue Gas Desulfurization, Proper Kiln Design and Operation, and Optimized Mud Washing
Georgia Pacific Corp. - Monticello Mill	MS	1500-00007	3/3/2005	Lime Kiln	146 MMBtu/hr	Natural Gas & NCGs	--	23.4	102.5	Wet (Venturi) Scrubber with Optimal Mud Washing
Georgia Pacific Corp. - Monticello Mill	MS	1500-00007	7/9/2003	Lime Kiln	200 MMBtu/hr	Natural Gas & NCGs	--	12.4	54.9	Scrubber
Georgia Pacific Corp. - Port Hudson Operations	LA	PSD-LA-581 (M-2)	1/25/2002	Lime Kiln No. 1	340 TPD	--	--	3.26	14.27	Wet Scrubbers and Optimal Mud Washing
				Lime Kiln No. 2	340 TPD	--	--	2.59	11.33	Wet Scrubbers and Optimal Mud Washing
Longview Fiber Company	WA	PSD-01-03	12/10/2001	Lime Kilns 1 & 2	140 TPD CaO each	--	20 @ 10% O_2 (3-hr avg)	--	16	--
				Lime Kiln 3	240 TPD CaO	--	20 @ 10% O_2 (3-hr avg)	--	27	--
				Lime Kiln 4	250 TPD CaO	--	20 @ 10% O_2 (3-hr avg)	--	28	--
				Lime Kiln 5	325 TPD CaO	--	20 @ 10% O_2 (3-hr avg)	--	28	--
International Paper - Mansfield Mill	LA	PSD-LA 93 (M-6)	8/14/2001	Lime Kiln	142 MMBtu/hr	--	--	8.4	29.3	CaO and Wet Scrubber using Caustic Solution
Donahue Industries, Inc. - Paper Mill	TX	PSD-TX-437	10/17/2000	Lime Kiln	--	Natural Gas & No. 2 Fuel Oil	--	5.4	23	Scrubber and Sweet Natural Gas with a Sulfur Content Limit of 0.3%
Weyerhaeuser Co	MS	1680-00044	9/10/1996	Lime Kiln	504 TPD CaO	--	50 @ 10% O_2	--	--	Continues Use of Low-Sulfur Fuels
Riverwood International Corp	GA	2631-011-11958	7/11/1996	Lime Kilns 1 & 2	8.4 ton/hr CaO per kiln	--	--	41.6	--	--
Apple Grove Pulp & Paper Company, Inc.	WV	R14-11	6/17/1996	Lime Kilns (2)	65,600 lb/hr CaO	Natural Gas	30	9.1	--	Fabric Filter
Willamette Industries - Marlboro Mill	SC	1680-0043	4/17/1996	Lime Kiln	450 TPD CaO	Natural Gas	30	10.5	46	Kiln Operation

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, December, 2006

TABLE 5-5
SUMMARY OF BACT DETERMINATIONS FOR SULFUR DIOXIDE CONTROL IN LIME KILNS LISTED BY THE EPA

Pollutant	Control Technology
SO_2	Flue Gas Desulfurization/Wet Scrubbers
SO_2	Optimal Mud Washing
SO_2	Proper Kiln Design and Operation
SO_2	Use of Low Sulfur Fuels

TABLE 5-6
SULFUR DIOXIDE CONTROL TECHNOLOGY FEASIBILITY ANALYSIS FOR THE LIME KILN, SSCE PANAMA CITY

Particulate Matter Control Technology	Estimated Efficiency	Feasible and Demonstrated? (Y/N)	Rank Based on Control Efficiency	Employed by the Lime Kiln?
Use of Low Sulfur Fuels	0-100%	N	--	N
Flue Gas Desulfurization/Wet Scrubbers	90%+	Y	1	Y
Proper Kiln Design and Operation	80%	Y	2	Y
Optimal Mud Washing	50%	Y	3	Y

6.0 AIR QUALITY IMPACT ANALYSIS METHODOLOGY

The EPA and FDEP rules require major new facilities and major modifications of existing facilities to EPA regulations (40 CFR 52.21(k)) require that an applicant perform a source impact analysis for each applicable pollutant. This air quality impact analysis is provided to demonstrate that the SSCE Mill's increase in emissions of SO_2 and NO_x due to the Lime Kiln petcoke project will comply with the AAQS and allowable PSD Class I and II increments.

The PSD regulations specifically provide for the use of atmospheric dispersion models in performing impact analyses, estimating baseline and future air quality levels, and determining compliance with AAQS and allowable PSD increments. This section presents the air quality modeling methodology and results.

6.1 General Air Quality Modeling Analysis Approach

The air quality impact analysis of the SSCE mill was conducted following EPA and FDEP modeling guidelines for assessing compliance with the AAQS and PSD increments.

The SSCE mill is located approximately 96 and 112 km, from the PSD Class I areas of the Bradwell Bay and the St. Marks NWA, respectively. Therefore, SO_2 and NO_2 concentrations were predicted at those areas.

More detailed descriptions of the models, along with the emission inventory, meteorological data, and receptor grids used in the analysis are presented in the following sections.

6.2 Significant Impact Analysis Approach

6.2.1 Site Vicinity

A significant impact analysis was performed to determine the magnitude and distance to which the project's SO_2 and NO_2 impacts are predicted to exceed the EPA's significant impact levels at any location beyond the plant's restricted boundaries. The EPA's significant SO_2 impact levels are 25, 5, and 1 microgram per cubic meter ($\mu g/m^3$) for the 3-hour, 24-hour, and annual averaging periods, respectively (refer to Table 3-1). The EPA's significant NO_2 impact level is 1 $\mu g/m^3$ for the annual averaging period.

If the project-only impacts are above the significant impact levels in the vicinity of the facility, then two additional and more detailed air modeling analyses are required. The first analysis is performed to demonstrate compliance with national and Florida AAQS, and the second analysis is performed to demonstrate compliance with allowable PSD Class II increments.

6.2.2 PSD Class I Areas

Generally, if the facility undergoing the modification is within 200 km of a PSD Class I area, then a significant impact analysis is also performed to evaluate the impact due to the project alone at the PSD Class I area. Because the Bradwell Bay and St. Marks NWA are located within 200 km of the SSCE Mill, the maximum predicted SO_2 and NO_2 impacts at those areas are compared to the proposed EPA's SO_2 and NO_2 significant impact levels for PSD Class I areas. The SO_2 significant impact levels are 1.0, 0.2, and 0.1 $\mu g/m^3$ for the 3-hour, 24-hour, and annual averaging periods, respectively (refer to Table 3-1). The NO_2 significant impact level is 0.1 $\mu g/m^3$ for the annual averaging period. These recommended levels have never been promulgated as rules, but are the currently accepted criteria to determine whether a proposed project will incur a significant impact on a PSD Class I area.

If the project-only impacts at the PSD Class I area are predicted to be above the proposed EPA PSD Class I significant impact levels, then an analysis is performed to demonstrate compliance with allowable PSD Class I impacts at the PSD Class I area.

6.3 AIR MODELING ANALYSIS APPROACH

6.3.1 General Procedures

Because there will be a significant increase in SO_2 and NO_x emissions from the Lime Kiln petcoke project, air modeling analyses are required to determine if the project-only impacts are predicted to be greater than the significant impact levels. These analyses consider impacts due to the proposed project alone. Air quality impacts are predicted using 5 years of meteorological data and selecting the highest predicted ground-level concentrations for comparison to the significant impact levels. To predict the maximum annual and short-term concentrations for the proposed project, a high-resolution receptor grid was used along with 5 years of hourly meteorology data. If the modification's impacts are greater than the significant impact levels, the air modeling analyses must consider other nearby sources and background concentrations to predict a total concentration for comparison to AAQS and PSD increments.

Generally, when using 5-years of meteorological data for the analysis, the highest annual and the highest, second-highest (HSH) short-term concentrations are compared to the applicable AAQS and allowable PSD increments. The HSH concentration is calculated for a receptor field by:

1. Eliminating the highest concentration predicted at each receptor,
2. Identifying the second-highest concentration at each receptor, and
3. Selecting the highest concentration among these second-highest concentrations.

The HSH approach is consistent with air quality standards and allowable PSD increments, which permit a short-term average concentration to be exceeded once per year at each receptor.

The AAQS analysis is a cumulative source analysis that evaluates whether the concentrations from all sources will comply with the AAQS. These concentrations include the modeled impacts from sources at the project site and from other nearby facility sources added to a background concentration. The background concentration accounts for sources not included in the modeling analysis.

The PSD Class II analysis is a cumulative source analysis that evaluates whether the concentrations for increment-affecting sources will comply with the allowable PSD Class II increments. These concentrations include the modeled impacts from PSD increment-affecting sources at the project site, plus nearby PSD increment-affecting sources at other facilities.

6.3.2 PSD Class I Analysis

For each pollutant for which a significant impact is predicted at the PSD Class I area, a PSD Class I analysis is required. The PSD Class I analysis is a cumulative source analysis that evaluates whether the concentrations for increment-affecting sources located within 200 km of the PSD Class I area will comply with the allowable PSD Class I increments. These concentrations include the impacts from PSD increment-affecting sources at the project site, plus the impacts from PSD increment-affecting sources at other facilities.

6.4 Model Selection

The selection of an air quality model to calculate air quality impacts was based on its applicability to simulate impacts in areas surrounding the SSCE Mill, as well as at the PSD Class I area of interest.

Two air quality dispersion models were selected and used in these analyses to address air quality impacts for the proposed project. These models were:

- The American Meteorological Society/EPA dispersion model (AERMOD); and
- The California Puff model (CALPUFF).

6.4.1 AERMOD

The area surrounding the Mill is mostly rural and flat. The Mill is located on the eastern side of St. Andrews Bay. A topographic map of the Mill vicinity is presented in the application form. Based on these features, the AERMOD dispersion model (Version 07026) was selected to evaluate the pollutant impacts due to the Mill alone and in combination with other emission sources.

For this analysis, the EPA regulatory default options were used to predict all maximum impacts. These options include:

- Final plume rise at all receptor locations,
- Stack-tip downwash,
- Buoyancy-induced dispersion,
- Default wind speed profile coefficients,
- Default vertical potential temperature gradients, and
- Calm wind processing.

The AERMOD model is maintained by the EPA on its Internet website, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN). A listing of AERMOD model features is presented in Table 6-1.

The EPA and FDEP recommend that the AERMOD model be used to predict pollutant concentrations at receptors located within 50 km from a source. The AERMOD model calculates hourly concentrations based on hourly meteorological data. The AERMOD model is applicable for most applications since it is recognized as containing the latest scientific algorithms for simulating plume behavior in all types of terrain. For evaluating plume behavior within the building wake of structures, the AERMOD model incorporates the Plume Rise Model Enhancement (PRIME) downwash algorithm developed by the Electric Power Research Institute (EPRI). AERMOD can predict pollutant concentrations for averaging times of annual and 24, 8, 3, and 1 hour.

The AERMOD model was used to predict the maximum pollutant concentrations due to the project in nearby areas surrounding the site. The AERMOD model was also used to predict the maximum pollutant concentrations due to the project's emissions together with appropriate background sources. The predicted concentrations were then compared to the applicable AAQS and PSD Class II increments.

6.4.2 CALPUFF

At distances beyond 50 km from a source, the CALPUFF model, Version 5.711a (EPA, 2003), is recommended for use by the EPA and the Federal Land Manager (FLM). Major features of the CALPUFF model are presented in Table 6-2. The CALPUFF model is a long-range transport model applicable for estimating the air quality impacts in areas that are more than 50 km from a source. The CALPUFF model is maintained by the EPA on the SCRAM internet website. The methods and assumptions used in the CALPUFF model are based on the latest recommendations for modeling analysis as presented in the following reports:

- The Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (EPA, 1998); and
- The Federal Land Manager's Air Quality Relative Values Workgroup (FLAG) Phase I Report (December, 2000).

In addition, updates to the modeling methods and assumptions were followed based on discussion with the FLM.

The CALPUFF model was used to perform a significant impact analysis for the proposed project at the PSD Class I areas of the Bradwell Bay and St. Marks NWA. In addition, the CALPUFF model was used to predict the proposed project's maximum potential impacts on air quality related values (AQRV) at the PSD Class I areas. Visibility and acid deposition are AQRVs at the St. Marks NWA, while acid deposition is an AQRV of the Bradwell Bay NWA.

6.5 Meteorological Data

6.5.1 AERMOD

Meteorological data used in the AERMOD model to determine air quality impacts consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) offices located at the Apalachicola and Tallahassee

Regional Airports, respectively. Concentrations were predicted using 5 years of hourly meteorological data from 2001 through 2005. The hourly surface observations obtained by the Apalachicola NWS include the marine effects of the Gulf of Mexico and are considered the most representative of the climatology at the project site location.

A unique feature of AERMOD is its incorporation of land use parameters for the processing of boundary layer parameters used for the dispersion. Based on the most recent regulatory guidance, the land use parameters should be representative of the data measurement site (i.e., NWS at Apalachicola). Land use data, representing the average surface roughness, albedo, and Bowen ratio that exist within a 3-km radius of the NWS station at Apalachicola were extracted from 1-degree land use files from the U.S. Geographical Survey (USGS) using the AERSURFACE program. AERSURFACE currently extracts land use data in 12 wind direction sectors covering 360 degrees. These parameters were compared to those estimated in the same manner around the project site. Based on this comparison, the values for all parameters were similar.

6.5.2 CALPUFF

For CALPUFF, the air modeling analysis was conducted using the latest meteorological and geophysical databases which have been developed for use with the most recent versions of CALPUFF. These datasets were prepared by the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) for the purpose of conducting visibility impairment analyses under the Best Available Retrofit Technology (BART) Rule

For this Project, the VISTAS Florida CALMET domain with 4-km spacing (VISTA refined Domain 2) was used. The data cover the period from 2001 to 2003. Golder obtained these datasets from the FDEP. The FDEP and FLM have recommended their use for PSD projects.

6.6 Emission Inventory

6.6.1 Significant Impact Analysis

The emissions for the SSCE Mill used in the significant impact analysis are summarized in Table 6-3. The proposed increases in SO_2 and NO_x emissions for the Lime Kiln were used in the PSD Class II and Class I significant impact analyses. Also shown are the contemporaneous increases in NO_x from the No. 3 Combination Boiler project (18 TPY), which was identified in Table 3-3. The stack and operating parameters are presented in Table 6-4. Source locations are in UTM East and North coordinates UTM Zone 16.

Based on modeling results presented in Section 6.10, the proposed increase in SO_2 air quality impacts for the Lime Kiln petcoke project are predicted to be greater than the PSD Class II significant impact levels. Therefore, additional modeling analyses are required to demonstrate compliance with the AAQS and PSD Class II increments. The maximum SO_2 concentrations due to the increase are predicted to be significant out to 3.6 km from the SSCE Mill for the 3-hour averaging time; 3.4 km from the Mill for the 24-hour averaging time; and 0.9 km from the Mill for the annual averaging time.

The proposed increase in NO_2 air quality impacts for the Lime Kiln petcoke project are also predicted to be greater than the PSD Class II significant impact level. Therefore, additional modeling analyses are required to demonstrate compliance with the AAQS and PSD Class II increments for NO_2. The maximum NO_2 concentrations due to the increase are predicted to be significant out to 1.3 km from the SSCE Mill for the annual averaging time.

For the PSD Class I areas, the proposed increase in SO_2 and NO_2 air quality impacts for the Lime Kiln petcoke project are predicted to be less than the PSD Class I significant impact levels. Therefore, additional modeling analyses to demonstrate compliance with the allowable PSD Class I increments is not required.

6.6.2 AAQS and PSD Class II Analyses

As discussed in Section 6.6.1, the maximum impacts from the proposed Lime Kiln petcoke project were predicted to be greater than the SO2 and NO2 significant impact levels. As a result, a cumulative source analysis is required to demonstrate compliance with the SO2 and NO2 AAQS and allowable PSD Class II increments.

The future maximum source SO2 and NOx emissions for the SSCE Mill are presented in Table 6-5. The basis of the maximum emissions is shown in Appendix D. This includes the maximum emissions for the Nos. 3 and 4 Combination Boilers for each of the two cases of the Recovery Boilers building enclosure. Note that for some cases, individual combination boiler maximum emissions are shown as well as a cap over both combination boilers.

The 1974 PSD baseline emissions for SO2, and the 1988 baseline emissions for NOx, used for determining PSD increment consumption, are presented in Table 6-6. These were obtained from previous SSCE Panama City Mill modeling analyses.

Future and baseline stack parameters and source locations are presented in Table 6-7. The future source emissions and operating parameters were used for the AAQS modeling analysis, while the future and 1974/1988 baseline source emissions and parameters were used for the PSD Class II increment analyses.

Because there were separate 3-hour and 24-hour average SO2 emission rates for the Nos. 3 and 4 Combination Boilers, additional modeling runs were performed for the SSCE Mill and Arizona Chemical Company (ACC) sources only to determine the worst-case Combination Boiler SO2 emission configuration that will result in the highest predicted impacts for each future Recovery Boilers building case. The results of this analysis are summarized in Section 6.12.

For the future case of the future Recovery Boilers building with only one wall enclosed (i.e., future Case 1), the highest, second-highest (HSH) 24-hour SO2 impact occurred with Combination Boiler No. 4 emitting at its maximum 24-hour average emission rate of 887 lb/hr, with the No. 3 Combination Boiler emitting 463 lb/hr, which is the remaining SO2 emissions to stay within the 24-hour cap of 1,350 lb/hr.

For the future case of the future Recovery Boilers building being fully enclosed (i.e., future Case 2), the HSH 24- and 3-hour SO2 impacts occurred when Combination Boiler No 3 was at its maximum SO2 emission rate, with the remaining SO2 emissions under the cap emitted by the No. 4 Combination Boiler (refer to Table 6-5).

The emission inventories for other non-SSCE and ACC facilities were updated from the previous analyses performed for the SSCE Mill (2000, 2002, 2004), source information provided by the FDEP, and from subsequent discussions with FDEP. For the PSD Class II increment analyses, ACC's Thermal Oxidizer and Bay County Energy Systems were identified as the only PSD increment consuming sources in the vicinity of the SSCE Mill. Future SO_2 emissions for ACC's boilers were obtained from the FDEP, while PSD baseline emissions were obtained from previous air modeling analyses. ACC's Boiler No 1 is no longer active, and was therefore assumed to be a PSD increment expanding facility.

FDEP has approved a technique for eliminating sources in the modeling analyses if the source's emissions do not meet an emission criterion. The technique is the Screening Threshold method, developed by the North Carolina Department of Natural Resources and Community Development

(NCDNRCD), and approved by EPA. The method is designed to objectively eliminate from the emission inventory those sources that are unlikely to have a significant interaction with the source undergoing evaluation. In general, sources that should be considered in the modeling analyses are those with emissions greater than a screening threshold value (in TPY) that is calculated by the following criteria:

$$Q = 20 \times D\text{-}SIA$$

where Q = the screening threshold value (TPY), and

D = The distance (km) from the proposed facility to the source undergoing evaluation for short-term analysis, or

SIA = The distance (km) to the edge of the facility's significant impact area.

For this analysis, the long-term criterion was used since fewer facilities would be eliminated than with the short-term criterion. Also, the total emissions from a facility were used rather than emissions from individual sources for comparison to the screening threshold value. These methods result in a more conservative approach to produce higher-than-expected concentrations. Those facilities with maximum allowable emissions that are below the calculated *screening threshold* were eliminated from further consideration in the AAQS and PSD Class II increment modeling analyses.

A summary of all nearby background SO_2 facilities, their locations with respect to the SSCE Mill, and their allowable emission rates is provided in Table 6-8. Based on the NC screening technique, the facilities to be included in the air modeling analysis are ACC, Granger Asphalt Paving, Gulf Asphalt Corporation, Triangle Construction Road Building, Gulf Power Corporation's Lansing Smith Power Plant, and Bay County Energy Systems. Based on discussions with the FDEP, the Florida Coast Paper facility in Gulf County, which is now owned by SSCE and had been modeled in previous air impact analyses, has been dismantled and is no longer operating. As a result, this facility was not included in the air modeling analysis for assessing compliance with the AAQS but was included as a baseline source for assessing compliance with the PSD increments. The Gulf Power Scholz Power Plant was included because of its high allowable emission rate.

The individual source emission, stack, and operating parameters for sources considered in the AAQS and PSD Class II modeling analyses are presented in Table 6-9. To minimize model run time, identical stacks within facilities were combined into one source and small emission sources within distant facilities were combined into one source.

A summary of all nearby NO_X background facilities, their locations with respect to the SSCE Mill, and their allowable emission rates is provided in Table 6-10. Based on the NC screening technique, the facilities to be included in the air modeling analysis are ACC and the Gulf Power Corporation's Lansing Smith Power Plant. ACC's Thermal Oxidizer and all the combustion turbines at the Lansing Smith Power Plant were assumed to consume PSD increment.

The individual source emission, stack, and operating parameters for sources considered in the AAQS and PSD Class II modeling analyses are presented in Table 6-11. To minimize model run time, identical stacks within facilities were combined into one source and small emission sources within distant facilities were combined into one source.

6.6.3 Class I Analysis

A list of background SO_2 and NO_x PSD facilities was not required because the PSD Class I significant impact levels were not exceeded by the proposed project. The predicted SO_2 and NO_2 impacts at the Class I areas of the Bradwell Bay and St. Marks NWA were used to support the air quality related values (AQRV) analysis presented in Section 7.0. For the Class I impact analysis, the net emissions increase due to the Lime Kiln petcoke project was modeled for each pollutant for various averaging times.

6.7 Building Downwash Effects

In accordance with current EPA policy, the effect of building downwash effects on predicted air quality concentration levels was evaluated. Building dimensions for all key SSCE Mill buildings were entered into the EPA-developed Building Profile Input Program (BPIP, Version 04274) to obtain direction-specific building heights, lengths, and widths for all SSCE Mill point sources. The BPIP model was used in its PRIME mode to generate the appropriate PRIME downwash input dimensions for the AERMOD model. The direction-specific building dimensions are input for Hb and lb for 36 radial directions, with each direction representing a 10-degree sector. The Hb is the building height and lb is the lesser of the building height or projected width. In addition, the AERMOD model inputs three additional building parameters that further describe the building/wake configuration:

- Projected length of the building along the flow direction,
- Along-flow distance from the stack to the center of the upwind face of the projected building, and
- Cross-flow distance from the stack to the center of the upwind face of the projected building.

The building dimensions considered in the air modeling analysis for the SSCE Mill are presented in Table 6-12. The building dimensions reflect SSCE's plans to further enclose the Recovery Boilers building at the Mill. Enclosing the Recovery Boilers building is being performed in two phases and Recovery Boilers building dimensions for both phases are presented in Table 6-12. The first phase includes covering only the east side of the building up to the 173-ft. tier level. The second phase includes fully enclosing all sides of the Recovery Boilers building up to the same 173-ft. tier level. Because each completed enclosure phase increases the amount of building downwash that will be caused by the future Recovery Boilers building, maximum pollutant concentrations from some SSCE Mill sources will increase. As such, air modeling results are presented for both phases of the Recovery Boilers building enclosure for both the significant impact analysis and the SO_2 AAQS analyses. For all other analyses, the air modeling results are presented for the fully enclosed phase (Case 2), which has the worst-case building downwash and air quality impacts.

6.8 Receptor Locations

6.8.1 Site Vicinity

To determine the maximum impact for all pollutants and averaging times in the vicinity of the SSCE Mill, a general Cartesian grid was used to predict concentrations on and beyond the facility property line out to 5 km. Receptors were located at the following intervals and distances from the origin:

- Every 100 m from the site fenceline to 2,000 m;
- Every 250 m from 2,000 to 5,000 m;

Elevations and hill scale heights were calculated for each receptor using the AERMAP (06341) terrain processor and 7.5-minute Digital Elevation Model (DEM) data from the U.S. Geographical Survey.

6.8.2 Class I Area

For the determining project's impacts at the PSD Class I areas, pollutant concentrations were predicted in an array of 132 discrete receptors located at the PSD Class I area of the Bradwell Bay NWA and 101 discrete receptors located at the PSD Class I area of the St. Marks NWA. These receptors were obtained from the National Park Service (NPS).

6.9 Background Concentrations

The methods and assumptions used to determine SO_2 and NO_2 background concentrations for use in the modeling analysis were presented in Section 4.0.

6.10 Air Quality Impact Analysis Results

6.10.1 PSD Class II Significant Impact Analysis

The maximum SO_2 and NO_2 concentrations predicted for the Lime Kiln petcoke project only for comparison to the PSD Class II significant impact levels are presented in Table 6-13. Because the project's SO_2 and NO_2 impacts are predicted to be above the PSD Class II significant impact levels, additional modeling analyses are required to be performed to address compliance with AAQS and PSD Class II increments.

The proposed Project's predicted SO_2 and NO_2 concentrations were determined to be significant out to 3.6 km and 1.3 km, respectively, from the SSCE Mill. The 5-km receptor grid used for the significant impact analysis was also used for the AAQS and PSD Class II increment analyses.

6.11 PSD Class I Significant Impact Analysis

The maximum SO_2 and NO_2 concentrations predicted for the Lime Kiln petcoke project only for the PSD Class I significant impact analysis at the Bradwell Bay NWA and St. Marks NWA are presented in Table 6-14. The maximum 3-hour, 24-hour and annual average SO_2 impacts are predicted to be less than the PSD Class I significant impact levels. The maximum annual average NO_2 impacts are also predicted be less than the PSD Class I significant impact levels. Therefore, additional modeling analyses are not required to address compliance with the SO_2 and NO_2 PSD Class I increments.

6.12 SSCE Combination Boiler Maximum SO_2 Emission Rates

A summary of predicted concentrations for the SSCE Mill and ACC sources only is presented in Table 6-15 for various short-term combination boiler SO_2 emission rates. From Table 6-15, the following combination boiler maximum emission rates result in the highest concentrations for comparing to the AAQS or allowable Class II increments:

- Case 1 (east wall enclosure only): 24-hour cap of 1,350 lb/hr for both boilers with the No. 4 Combination Boiler operating at its maximum 24-hour limit (from BART) of 690 lb/hr.
- Case 2 (full enclosure): 24-hour cap of 1,100 lb/hr for both boilers with the No. 3 Combination Boiler operating at it maximum 24-hour limit of 887 lb/hr (current permit limit).
- Case 2 (full enclosure): 3-hour cap of 1,350 lb/hr for both boilers with the No. 3 Combination Boiler operating at it maximum limit of 887 lb/hr.

The worst-case combination boiler emission cases were included in the cumulative source SO_2 modeling analysis.

6.13 AAQS Impact Analysis

The maximum 3-hour, 24-hour and annual SO_2 concentrations predicted for the modeled AAQS sources are presented in Table 6-16. The modeling results were added to the measured non-modeled background concentration to produce a cumulative total air quality concentration for comparison to the AAQS.

For the future Case 1, the maximum concentrations for the SO_2 AAQS analysis are predicted to be 967, 259, and 37.2 $\mu g/m^3$ for the 3-hour, 24-hour and annual averaging times, respectively. These concentrations are all below the AAQS of 1,300, 260, and 60 $\mu g/m^3$ for the respective averaging times.

For the future Case 2, the maximum SO_2 AAQS concentrations are predicted to be 688, 257, and 35.6 $\mu g/m^3$ for the 3-hour, 24-hour and annual averaging times, respectively. These concentrations are also below the AAQS of 1,300, 260, and 60 $\mu g/m^3$ for the respective averaging times.

The maximum annual NO_2 concentrations predicted for the AAQS analysis are presented in Table 6-17. The highest annual average concentration for Case 2, the fully enclosed Recovery Boilers building, is 32.3 $\mu g/m^3$ which is below the AAQS of 100 $\mu g/m^3$.

6.14 PSD Class II Increment Analysis

The maximum 3-hour, 24-hour and annual SO_2 concentrations predicted for the modeled PSD Class II sources are presented in Table 6-18. The maximum predicted concentrations are 447, 78, and 0.12 $\mu g/m^3$ for the 3-hour, 24-hour and annual averaging times, respectively. These concentrations are below the allowable PSD Class II increments of 512, 91, and 20 $\mu g/m^3$, for the 3-hour, 24-hour, and annual averaging times, respectively.

The maximum annual NO_2 concentrations predicted for the modeled PSD Class II sources are presented in Table 6-19. The maximum concentration is predicted to be 12.5 $\mu g/m^3$ for the annual averaging time, which is below the allowable PSD Class II increment of 25 $\mu g/m^3$.

6.15 Class I Impact Analysis

The maximum SO_2 and NO_2 concentrations predicted for the Lime Kiln petcoke project only at the PSD Class I areas are presented in Table 6-14 for various averaging times.

6.16 Conclusions

Based on the results of the air quality modeling analyses, the maximum SO_2 and NO_2 concentrations due to the proposed increases in SO_2 and NO_x emissions from the Lime Kiln petcoke project, together with those from other air emission sources, will comply with all applicable AAQS and PSD increments.

TABLE 6-1
MAJOR FEATURES OF THE AERMOD MODEL, VERSION 04300

AERMOD Model Features
• Plume dispersion/growth rates are determined by the profile of vertical and horizontal turbulence, vary with height, and use a continuous growth function.
• In a convective atmosphere, uses three separate algorithms to describe plume behavior as it comes in contact with the mixed layer lid; in a stable atmosphere uses a mechanically mixed layer near the surface.
• Polar or Cartesian coordinate systems for receptor locations can be included directly or by an external file reference.
• Urban model dispersion is input as a function of city size and population density; sources can also be modeled individually as urban sources.
• Stable plume rise: uses Briggs equations with winds and temperature gradients at stack top up to half-way up to plume rise. Convective plume rise: plume superimposed on random convective velocities.
• Procedures suggested by Briggs (1974) for evaluating stack-tip downwash.
• Has capability of simulating point, volume, area, and multi-sized area sources.
• Accounts for the effects of vertical variations in wind and turbulence (Brower *et al.*, 1998).
• Uses measured and computed boundary layer parameters and similarity relationships to develop vertical profiles of wind, temperature, and turbulence (Brower *et al.*, 1998).
• Concentration estimates for 1-hour to annual average times.
• Creates vertical profiles of wind, temperature, and turbulence using all available measurement levels.
• Terrain features are depicted by use of a controlling hill elevation and a receptor point elevation.
• Modeling domain surface characteristics are determined by selected direction and month/season values of surface roughness length, Albedo, and Bowen ratio.
• Contains both a mechanical and convective mixed layer height, the latter based on the hourly accumulation of sensible heat flux.
• The method of Pasquill (1976) to account for buoyancy-induced dispersion.
• A default regulatory option to set various model options and parameters to EPA-recommended values.
• Contains procedures for calm-wind and missing data for the processing of short term averages.

Note: AERMOD = The American Meteorological Society and Environmental Protection Agency Regulatory Model.
Source: Paine *et al.*, 2004.

TABLE 6-2

MAJOR FEATURES OF THE CALPUFF MODEL, VERSION 5.711A

CALPUFF Model Features
• Source types: Point, line (including buoyancy effects), volume, area (buoyant, non-buoyant) • Non-steady-state emissions and meteorological conditions (time-dependent source and emission data; gridded 3-dimensional wind and temperature fields; spatially-variable fields of mixing heights, friction velocity, precipitation, Monin-Obukhov length; vertically and horizontally-varying turbulence and dispersion rates; time-dependent source and emission data for point, area, and volume sources; temporal or wind-dependent scaling factors for emission rates) • Efficient sampling function (integrated puff formulation; elongated puff (slug) formation) • Dispersion coefficient options (Pasquill-Gifford (PG) values for rural areas; McElroy-Pooler values (MP) for urban areas; CTDM values for neutral/stable; direct measurements or estimated values) • Vertical wind shear (puff splitting; differential advection and dispersion) • Plume rise (buoyant and momentum rise; stack-tip effects; building downwash effects; partial plume penetration above mixing layer) • Building downwash effects (Huber-Snyder method; Schulman-Scire method) • Complex terrain effects (steering effects in CALMET wind field; puff height adjustments using ISC model method or plume path coefficient; enhanced vertical dispersion used in CTDMPLUS) • Subgrid scale complex terrain (CTSG option) (CTDM flow module; dividing streamline as in CTDMPLUS) • Dry deposition (gases and particles; options for diurnal cycle per pollutant, space and time variations with a resistance model, or none) • Overwater and coastal interaction effects (overwater boundary layer parameters; abrupt change in meteorological conditions, plume dispersion at coastal boundary; fumigation; option to use Thermal Internal Boundary Layers (TIBL) into coastal grid cells) • Chemical transformation options (Pseudo-first-order chemical mechanisms for SO_2, SO_4, HNO_3, and NO_3; Pseudo-first-order chemical mechanisms for SO_2, SO_4, NO, NO_2, HNO_3, and NO_3 (RIVAD/ARM3 method); user-specified diurnal cycles of transformation rates; no chemical conversions) • Wet removal (scavenging coefficient approach; removal rate as a function of precipitation intensity and type) • Graphical user interface • Interface utilities (scan ISC-PRIME and AUSPLUME meteorological data files for problems; translate ISC-PRIME and AUSPLUME input files to CALPUFF input files)

Note: CALPUFF = California Puff Model

Source: EPA, 2004.

TABLE 6-3
EMISSIONS USED IN SIGNIFICANT IMPACT ANALYSIS, SSCE PANAMA CITY

Emission Unit	Unit ID	Past Actual Emissions				Future Potential Emissions			
		Short-Term		Long-Term		Short-Term		Long-Term	
		lb/hr	g/s	TPY	g/s	lb/hr	g/s	TPY	g/s
SO_2 Emissions									
Lime Kiln	LK1	5.6	0.71	22.8	0.66	32.9	4.15	103.0	2.96
NO_x Emissions									
Lime Kiln	LK1	35.6	4.49	184.2	5.30	87.8	11.06	369.1	10.62
No. 3 Combination Boiler	BB3	132.5 [a]	16.70	458.9	13.20	154.0 [b]	19.40	476.8	13.72

Unless otherwise noted, refer to Section 2.0 for basis of emission rates.

[a] Based on stack test conducted in February 2005, prior to the change on the No. 3 Combination Boiler.

[a] Based on stack test conducted in August 2006, after the change on the No. 3 Combination Boiler.

TABLE 6-4
STACK PARAMETERS AND LOCATIONS USED IN THE SIGNIFICANT IMPACT MODELING, SCCE PANAMA CITY MILL

		UTM Coordinates[a]		Stack Parameters				Operating Parameters				
		Easting	Northing	Height		Diameter		Temperature		Flow Rate	Velocity	
Emission Unit	Unit ID	(m)	(m)	(ft)	(m)	(ft)	(m)	(°F)	(K)	(acfm)	(ft/s)	(m/s)
Future Conditions												
Lime Kiln	LK1	632,992	3,335,117	61	18.6	6.26	1.91	166	348	92,800	50.3	15.3
No. 3 Combination Boiler[b]	BB3	632,811	3,335,180	213	64.9	7.75	2.36	160	344	211,100	74.6	22.7
Past Actual Conditions												
Lime Kiln	LK1c	632,992	3,335,117	61	18.6	6.26	1.91	166	348	92,800	50.3	15.3
No. 3 Combination Boiler[c]	BB3	632,811	3,335,180	213	64.9	7.75	2.36	139	333	225,000	79.5	24.2

[a] UTM Coordinate Zone 16, NAD27 Datum

[b] Based on Ocotber 2006 testing, after the proposed change, prorated to 300,000 lb/hr steam.

[c] Based on Ocotber 2005 testing, prior to the proposed change.

TABLE 6-5
MAXIMUM FUTURE SO_2 AND NO_x EMISSIONS FOR THE SSCE PANAMA CITY MILL

Emission Unit		Unit ID	SO_2 Emissions		NO_x Emissions	
			lb/hr	g/s	TPY	g/s
No. 1 Recovery Boiler		RB1	141.6	17.85	295.3	8.49
No. 2 Recovery Boiler		RB2	141.6	17.85	295.3	8.49
No. 1 Smelt Dissolving Tank		SDT1	0.31	0.04	5.4	0.16
No. 2 Smelt Dissolving Tank		SDT2	0.31	0.04	5.4	0.16
Lime Kiln		LK1	32.9	4.15	472.2	13.58
No. 3 Combination Boiler	3-hour	BB3	1,592.4	200.6	--	--
No. 4 Combination Boiler	3-hour	BB4	1,183.0	149.1	--	--
Case 1- No. 3 CB at Max						
No. 3 Combination Boiler	24-hour	BB3	887.0	111.8	773.9	22.26
No. 4 Combination Boiler	24-hour	BB4	463.0	58.3	1,462.9	42.08
		Total	1,350.0	170.1		
Case 1 - No. 4 CB at Max						
No. 3 Combination Boiler	24-hour	BB3	660.0	83.2	773.9	22.26
No. 4 Combination Boiler[a]	24-hour	BB4	690.0	86.9	1,462.9	42.08
		Total	1,350.0	170.1		
Case 2- No. 3 CB at Max						
No. 3 Combination Boiler	24-hour	BB3	887.0	111.8	773.9	22.26
No. 4 Combination Boiler	24-hour	BB4	213.0	26.8	1,462.9	42.08
		Total	1,100.0	138.6		
Case 2 - No. 4 CB at Max						
No. 3 Combination Boiler	24-hour	BB3	410.0	51.7	773.9	22.26
No. 4 Combination Boiler[a]	24-hour	BB4	690.0	86.9	1,462.9	42.08
		Total	1,100.0	138.6		

[a] SO_2 emissions based on BART application.

Note: Refer to Table D-1 in Appendix D for derivation of emission rates.

Case 1 denotes installation of one wall on Recovery Boilers building.

Maximum SO_2 emissions for Nos. 3 and 4 Combination Boilers combined limited to 1,350 lb/hr.

Case 2 denotes installation of full enclosure on Recovery Boilers building.

Maximum SO_2 emissions for Nos. 3 and 4 Combination Boilers combined limited to 1,100 lb/hr.

TABLE 6-6
1974/1988 PSD BASELINE EMSSIONS USED IN THE MODELING ANALYSIS FOR THE SCCE PANAMA CITY MILL

Emission Unit	Unit ID	1974 Baseline SO_2 Emissions		1988 Baseline NO_x Emissions	
Short-Term Emissions		lb/hr	g/s		
No. 1 Recovery Boiler	RB1b	121.5	15.3		
No. 2 Recovery Boiler	RB2b	121.5	15.3		
No. 1 Smelt Dissolving Tank	SDT1b	7.5	0.9		
No. 2 Smelt Dissolving Tank	SDT2b	7.5	0.9		
Lime Kiln	LK1b	3.2	0.4		
No. 4 Power Boiler[a]	PB45b	205.5	25.9		
No. 5 Power Boiler[a]		212.0	26.7		
No. 6 Power Boiler	PB6b	524.0	66.0		
No. 3 Combination Boiler	BB3b	342.9	43.2		
No. 4 Combination Boiler	BB4b	546.0	68.8		
TOTALS		2,091.6	263.5		
Long-Term Emissions		TPY	g/s	TPY	g/s
No. 1 Recovery Boiler	RB1b	452.8	13.0	276.9	8.0
No. 2 Recovery Boiler	RB2b	452.8	13.0	287.4	8.3
No. 1 Smelt Dissolving Tank	SDT1b	26.4	0.8	7.0	0.2
No. 2 Smelt Dissolving Tank	SDT2b	26.4	0.8	7.8	0.2
Lime Kiln	LK1b	12.0	0.3	137.0	3.9
No. 4 Power Boiler[a]	PB45b	773.9	22.3	--	--
No. 5 Power Boiler[a]		773.9	22.3	97.5	2.8
No. 6 Power Boiler	PB6b	1,934.7	55.7	--	--
No. 3 Combination Boiler	BB3b	1,335.9	38.4	228.3	6.6
No. 4 Combination Boiler	BB4b	2,114.8	60.8	484.3	13.9
TOTALS		7,903.6	227.4	1,526.2	43.9

[a] Nos. 4 and 5 Power Boilers shared a common stack and were modeled as one source.
Reference: Pulp Production Increase Application response letter dated Feb. 18, 2002.

TABLE 6-7
STACK PARAMETERS AND LOCATIONS USED IN THE AIR MODELING ANALYSIS FOR THE SCCE PANAMA CITY MILL

Emission Unit	Unit ID	UTM Coordinates[a] Easting (m)	UTM Coordinates[a] Northing (m)	Stack Parameters Height (ft)	Stack Parameters Height (m)	Stack Parameters Diameter (ft)	Stack Parameters Diameter (m)	Operating Parameters Temperature (°F)	Operating Parameters Temperature (K)	Operating Parameters Flow Rate (acfm)	Operating Parameters Velocity (ft/s)	Operating Parameters Velocity (m/s)
Future Conditions												
No. 1 Recovery Boiler[b]	RB1	632,870	3,335,118	233	71.0	6.50	1.98	300	422	167,422	84.1	25.6
No. 2 Recovery Boiler[b]	RB2	632,864	3,335,151	233	71.0	6.50	1.98	310	428	163,002	81.9	25.0
No. 1 Smelt Dissolving Tank	SDT1	632,838	3,335,146	233	71.0	6.00	1.83	153	340	50,399	29.7	9.1
No. 2 Smelt Dissolving Tank	SDT2	632,851	3,335,161	233	71.0	6.00	1.83	150	339	43,458	25.6	7.8
Lime Kiln	LK1	632,992	3,335,117	61	18.6	6.26	1.91	166	348	92,800	50.3	15.3
No. 3 Combination Boiler	BB3	632,811	3,335,180	213	64.9	7.75	2.36	160	344	211,100	74.6	22.7
No. 4 Combination Boiler	BB4	632,805	3,335,173	213	64.9	7.83	2.39	147	337	229,767	79.5	24.2
SO_2 PSD Baseline (1974) Conditions												
No. 1 Recovery Boiler[b]	RB1b	632,851	3,335,136	233	71.0	6.42	1.96	310	428	170,920	88.0	26.8
No. 2 Recovery Boiler[b]	RB2b	632,864	3,335,151	233	71.0	6.42	1.96	320	433	157,907	81.3	24.8
No. 1 Smelt Dissolving Tank	SDT1b	632,838	3,335,146	233	71.0	6.00	1.83	150	339	28,670	16.9	5.2
No. 2 Smelt Dissolving Tank	SDT2b	632,851	3,335,161	233	71.0	6.00	1.83	140	333	29,518	17.4	5.3
Lime Kiln	LK1b	632,992	3,335,117	61	18.6	8.00	2.44	160	344	101,335	33.6	10.2
No. 4 Power Boiler[c]	PB45b	632,794	3,335,161	296	90.2	12.00	3.66	400	478	168,289	24.8	7.6
No. 5 Power Boiler[c]		632,794	3,335,161	296	90.2	12.00	3.66	400	478	168,289	24.8	7.6
No. 6 Power Boiler	PB6b	632,887	3,335,157	241	73.5	8.00	2.44	430	494	107,367	35.6	10.9
No. 3 Combination Boiler	BB3b	632,917	3,335,243	150	45.7	8.50	2.59	440	500	164,107	48.2	14.7
No. 4 Combination Boiler	BB4b	632,925	3,335,214	150	45.7	7.34	2.24	470	516	153,853	60.6	18.5
NO_x PSD Baseline (1988) Conditions												
No. 1 Recovery Boiler[b]	RB1b	632,851	3,335,136	233	71.0	6.42	1.96	310	428	170,920	88.0	26.8
No. 2 Recovery Boiler[b]	RB2b	632,864	3,335,151	233	71.0	6.42	1.96	320	433	157,907	81.3	24.8
No. 1 Smelt Dissolving Tank	SDT1b	632,838	3,335,146	233	71.0	6.00	1.83	150	339	28,670	16.9	5.2
No. 2 Smelt Dissolving Tank	SDT2b	632,851	3,335,161	233	71.0	6.00	1.83	140	333	29,518	17.4	5.3
Lime Kiln	LK1b	632,992	3,335,117	61	18.6	8.00	2.44	160	344	101,335	33.6	10.2
No. 5 Power Boiler[c]		632,794	3,335,161	296	90.2	12.00	3.66	400	478	168,289	24.8	7.6
No. 3 Combination Boiler	BB3b	632,917	3,335,243	213	64.9	7.83	2.39	149	338	222,751	77.1	23.5
No. 4 Combination Boiler	BB4b	632,925	3,335,214	213	64.9	7.83	2.39	143	335	258,865	89.6	27.3

[a] UTM Coordinate Zone 16, NAD27 Datum

[b] Source has two identical stacks. Parameters are for each stack.

[c] Nos. 4 and 5 Power Boilers shared a common stack and were modeled as one source.

Reference: PSD baseline data is from Pulp Production Increase application response letter dated Feb. 18, 2002.

TABLE 6-8
SUMMARY OF SO_2 EMITTING FACILITIES IN THE VICINITY OF THE SSCE PANAMA CITY LIME KILN PETCOKE PROJECT

Plant ID	Facility Name	UTM Coordinates East (km)	UTM Coordinates North (km)	Relative to SSCE Panama City [a] X (km)	Y (km)	Direction (deg.)	Distance (km)	Maximum SO_2 Emissions (TPY)	Q, (TPY) Emission Threshold [b,c] Dist x 20	Include in Modeling Analysis ?
Modeling Area										
0050001	Arizona Cl	633.1	3,335.4	0.3	0.3	45.0	0.4	58	NA	Yes
0050045	Gulf Termi	630.5	3,335.2	-2.3	0.1	273.2	2.3	4	5.9	No
Screening Area										
7775294	Anderson (	630.1	3,338.3	-2.7	3.2	320.0	4.2	70	43.0	Yes
7770062	C.W. Robt	628.1	3,340.3	-4.7	5.2	317.7	7.0	90	100.0	No
0050008	G.A.C. Co	634.9	3,343.7	2.1	8.6	13.7	8.9	74	137.1	No
0050014	Gulf Powe	625.0	3,349.1	-7.8	14.0	330.9	16.0	45,712	279.9	Yes
0050031	Bay Count	642.4	3,349.5	9.6	14.4	33.7	17.3	314	306.1	Yes
7774810	American :	622.1	3,362.2	-10.7	27.1	338.4	29.1	34	542.2	No
0450002	Arizona Cl	661.9	3,299.6	29.1	-35.5	140.7	45.9	97	877.1	No
Extended Screening Area										
1330005	Florida Ga	610.6	3,394.2	-22.2	59.1	339.4	63.1	11	1,222.6	No
7775118	C.W. Robt	584.1	3,377.8	-48.8	42.7	311.2	64.8	90	1,256.3	No
7770142	Apac-Sout	578.1	3,375.7	-54.7	40.6	306.6	68.1	23	1,322.0	No
0630031	White Con	654.2	3,403.5	21.4	68.4	17.4	71.7	96	1,393.4	No
0630002	Baxter Asp	666.7	3,406.9	33.9	71.8	25.3	79.4	41	1,548.0	No
0770009	CQ Biopo	709.4	3,358.1	76.6	23.0	73.3	80.0	24	1,559.6	No
7774811	C. W. Rob	711.0	3,365.2	78.2	30.1	69.0	83.7	47	1,634.8	No
7775017	White Con	579.5	3,400.5	-53.3	65.4	320.8	84.4	99	1,647.4	No
7770021	#412 Asph	577.2	3,400.7	-55.6	65.6	319.7	86.0	56	1,679.8	No
7770040	Apac-Sout	577.2	3,400.7	-55.6	65.6	319.7	86.0	91	1,679.9	No
0770010	Ga-Pacific	713.5	3,369.5	80.7	34.4	66.9	87.7	30	1,714.5	No
0630045	Waste Mai	650.5	3,423.1	17.7	88.0	11.4	89.7	65	1,754.9	No
0630014	Gulf Powe	702.4	3,395.8	69.6	60.7	48.9	92.4	34,900	1,807.0	Yes
0390029	Florida Ga	719.9	3,377.4	87.1	42.3	64.1	96.8	41	1,896.6	No
0390004	Florida De	707.6	3,399.2	74.8	64.1	49.4	98.5	202	1,930.2	No
0910064	Hurlburt Fi	529.7	3,364.7	-103.1	29.6	286.0	107.3	43	2,105.4	No

[a] The approximate center of the SSCE Pai East 632.80 km
North 3335.10 km

[b] The modeling area or significant impact area (SIA) fi 4.00 km

TABLE 6-9
SUMMARY OF SO_2 SOURCES INCLUDED IN THE AIR MODELING FOR THE AAQS AND PSD CLASS II COMPLIANCE ANALYSES
SSCE PANAMA CITY LIME KILN PETCOKE PROJECT

Facility ID	Facility Name / Emission Unit	EU ID	Model ID Name	UTM Location X (m)	UTM Location Y (m)	Stack Parameters: Height (ft)	Height (m)	Diameter (ft)	Diameter (m)	Temperature (°F)	Temperature (K)	Velocity (ft/s)	Velocity (m/s)	SO_2 Emission Rate (lb/hr)	SO_2 Emission Rate (g/sec)	PSD Consuming PSD Source? (EXP/CON)	Modeled in AAQS	Modeled in PSD Class II
0050001	Arizona Chemical Company - Panama City																	
	Boiler #2	15	ACPCB2	632,925	3,335,214	100.0	30.5	4.0	1.22	380	466.5	57.0	17.37	11.9	1.50	CON	YES	YES
	Thermal O	34	ACPCTO	632,889	3,335,209	120.0	36.6	3.8	1.14	1000	810.9	7.5	2.29	1.3	0.16	CON	YES	YES
0050045	Gulf Terminal Corporation																	
	3 Dual Fue	17	GTCSB	630,510	3,335,230	5.0	1.5	0.4	0.12	72	295.4	5.0	1.52	0.8	0.10	NO	YES	NO
7775294	Anderson Columbia Co Inc - Plant #4																	
	Astech Mo	1	ACPCAP	630,130	3,338,280	30.0	9.1	45.0	13.72	250	394.3	0.5	0.15	15.9	2.00	NO	YES	NO
7770062	C.W. Roberts Contracting Inc - Panama City Plant																	
	CMI Conti	2	CWRPCAI	628,090	3,340,280	44.0	13.4	5.1	1.54	215	374.8	40.6	12.37	20.5	2.58	NO	YES	NO
0050014	Gulf Power Company - Lansing Smith Plant																	
	Boiler #1 -	1	GPLSB1	625,030	3,349,080	199.0	60.7	18.0	5.49	260	399.8	102.7	31.30	4,084.1	514.59	NO	YES	NO
	Boiler #2 -	2	GPLSB2	625,030	3,349,080	199.0	60.7	18.0	5.49	260	399.8	102.7	31.30	6,064.7	764.14	NO	YES	NO
	Combustio	3	GPLSCT	625,030	3,349,080	33.0	10.1	13.7	4.18	1200	922.0	120.9	36.85	263.6	33.21	NO	YES	NO
	Unit #4 1	4	GPLSU4	625,030	3,349,080	121.0	36.9	16.8	5.12	186	358.7	73.8	22.49	12.7	1.60	NO	YES	NO
	Unit #5 1	5	GPLSU5	625,030	3,349,080	121.0	36.9	16.8	5.12	186	358.7	73.8	22.49	12.7	1.60	NO	YES	NO
0050031	Bay County Board of County Commissioners																	
	MSW Com	1	BCBCU1	642,400	3,349,500	125.0	38.1	4.5	1.37	400	477.6	58.7	17.89	35.8	4.51	CON	YES	YES
	MSW com	2	BCBCU2	642,400	3,349,500	125.0	38.1	4.5	1.37	400	477.6	58.7	17.89	35.8	4.51	CON	YES	YES
0630014	Gulf Power Company - Scholz Electric Generating Plant																	
	Boiler #1 (	1	GFCB1	702,400	3,395,800	150.0	45.7	13.5	4.11	330	438.7	40.0	12.19	3,984.0	501.98	NO	YES	NO
	Boiler #2 (	2	GFCB2	702,400	3,395,800	150.0	45.7	13.5	4.11	330	438.7	40.0	12.19	3,984.0	501.98	NO	YES	NO

Note: EXP = PSD expanding source
CON = PSD consuming source
NO = Baseline Source, does not affect PSD increment

TABLE 6-10
SUMMARY OF NO_X EMITTING FACILITIES IN THE VICINITY OF THE SSCE PANAMA CITY LIME KILN PETCOKE PROJECT

Plant ID	Facility Name	UTM Coordinates East (km)	UTM Coordinates North (km)	Relative to SSCE Panama City [a] X (km)	Y (km)	Direction (deg.)	Distance (km)	Maximum NOx Emissions (TPY)	Q, (TPY) Emission Threshold [b,c] (D - SIA) x 20	Include in Modeling Analysis ?
Modeling Area										
0050001	Arizona Chemical Company - Panama City Facility	633.1	3,335.4	0.3	0.3	45.0	0.4	198	NA	Yes
Screening Area										
0050088	Florida Vantage Cremation Svc	636.1	3,336.6	3.3	1.5	65.2	3.6	3	32.5	No
7775294	Anderson Columbia Co, Inc - Plant #4	630.1	3,338.3	-2.7	3.2	320.0	4.2	14	43.0	No
0050081	Wilson Funeral Home	627.5	3,339.1	-5.3	4.0	307.4	6.6	3	93.0	No
7770062	C W Roberts Contracting Inc - Panama City Plant	628.1	3,340.3	-4.7	5.2	317.7	7.0	14	100.0	No
0050024	United States Air Force	635.6	3,326.8	2.8	-8.3	161.4	8.8	70	135.2	No
0050008	G.A.C. Contractors Inc	634.9	3,343.7	2.1	8.6	13.7	8.9	13	137.1	No
0050078	City of Lynn Haven	632.1	3,344.4	-0.7	9.3	355.5	9.3	3	146.6	No
0050014	Gulf Power Company - Lansing Smith Plant	625.0	3,349.1	-7.8	14.0	330.9	16.0	11,645	279.9	Yes
0050031	Bay County Board of County Commissioners	642.4	3,349.5	9.6	14.4	33.7	17.3	236	306.1	No
0050028	SAGE Lumber Company LLC	609.9	3,354.3	-22.9	19.2	310.0	29.9	54	558.5	No
0450001	Premier Chemicals, LLC	664.7	3,302.8	31.9	-32.3	135.4	45.4	38	867.9	No
0450002	Arizona Chemical Company - Port St Joe Facility	661.9	3,299.6	29.1	-35.5	140.7	45.9	62	877.1	No
Extended Screening Area										
0770007	North Florida Lumber	689.5	3,358.9	56.7	23.8	67.3	61.5	29	1,190.4	No
7774815	White Construction Company, Inc - Trawick Pit	633.9	3,397.5	1.1	62.4	1.0	62.4	25	1,207.6	No
1330005	Florida Gas Transmission Company - Station 13	610.6	3,394.2	-22.2	59.1	339.4	63.1	1,109	1,222.6	No
7775118	C W Roberts Contracting Inc - Asphalt Plant 3	584.1	3,377.8	-48.8	42.7	311.2	64.8	19	1,256.3	No
1310019	Perdue Farms Inc	590.1	3,399.3	-42.7	64.2	326.4	77.1	32	1,502.1	No
0770009	CQ Biopower Producers, LLC	709.4	3,358.1	76.6	23.0	73.3	80.0	473	1,559.6	No
0630028	Spanish Train Lumber Co, LLC	681.3	3,399.1	48.5	64.0	37.2	80.3	71	1,566.2	No
7774811	C. W. Roberts Contracting, Inc - Hosford Asphalt Plant	711.0	3,365.2	78.2	30.1	69.0	83.7	12	1,634.8	No
7775017	White Construction Company, Inc - Defuniak Drum Mix Asphalt Plant	579.5	3,400.5	-53.3	65.4	320.8	84.4	25	1,647.4	No
0370008	Franklin County Board of Commissioners	708.6	3,297.1	75.8	-38.0	116.6	84.8	59	1,656.5	No
7770049	White Construction Company, Inc - Jones Pit Facility	657.8	3,417.2	25.0	82.1	16.9	85.8	29	1,676.4	No
0770010	Georgia-Pacific Corp - Hosford OSB Plant	713.5	3,369.5	80.7	34.4	66.9	87.7	417	1,714.5	No
0630045	Waste Management of Leon County, Inc	650.5	3,423.1	17.7	88.0	11.4	89.7	186	1,754.9	No
0630011	Rex Lumber, LLC	639.6	3,425.9	6.8	90.8	4.3	91.0	91	1,780.5	No
0630014	Gulf Power Company - Scholz Electric Generating Plant	702.4	3,395.8	69.6	60.7	48.9	92.4	1,349	1,807.0	No
0910031	United States Air Force	542.6	3,369.6	-90.2	34.5	290.9	96.6	32	1,891.5	No
0390029	Florida Gas Transmission Company - Station 14	719.9	3,377.4	87.1	42.3	64.1	96.8	1,403	1,896.6	No
0390004	Florida Dept of Children & Families	707.6	3,399.2	74.8	64.1	49.4	98.5	84	1,930.2	No
0910064	Hurlburt Field, USAF	529.7	3,364.7	-103.1	29.6	286.0	107.3	47	2,105.4	No

[a] The approximate center of the SSCE Panama City facility is located at UTM Coordinates: 632.80 3335.10

[b] The modeling area or significant impact area (SIA) for the project is estimated to be 2.00

[c] Distance from SSCE Mill to Arizona Chemical Company obtained from Arizona Chemical Co. plot plan.

TABLE 6-11
SUMMARY OF NO_X SOURCES INCLUDED IN THE AIR MODELING FOR THE AAQS AND PSD CLASS II COMPLIANCE ANALYSES
SSCE PANAMA CITY LIME KILN PETCOKE PROJECT

Facility ID	Facility Name / Emission Unit Description	EU ID	CALPUFF ID Name	UTM Location X (m)	UTM Location Y (m)	Stack Parameters: Height ft	Height m	Diameter ft	Diameter m	Temperature °F	Temperature K	Velocity ft/s	Velocity m/s	NO_x Emission Rate (lb/hr)	NO_x Emission Rate (g/sec)	PSD Consuming PSD Source? (EXP/CON)	Modeled in AAQS	Modeled in PSD Class II
0050001	Arizona Chemical Company - Panama City Facility																	
	Boiler #2	15	ACPCB2	633,100	3,335,400	100.0	30 5	4 0	1 22	380	466.5	57 0	17.37	33.1	4.17	No	Yes	No
	Thermal Oxidizer with caustic scrubber	34	ACPCTO	633,100	3,335,400	120 0	36 6	3 8	1.14	1000	810.9	7.5	2.29	1.6	0 20	CON	Yes	Yes
0050014	Gulf Power Company - Lansing Smith Plant																	
	Boiler Number 1 - 1,944 8 MMBtu/hr (Phase II Acid Rain)	1	GPLSB1	625,030	3,349,080	199 0	60 7	18 0	5 49	260	399 8	102.7	31.30	1,205.8	151.93	No	Yes	No
	Boiler Number 2 - 2,246 2 MMBtu/hr (Phase II Acid Rain)	2	GPLSB2	625,030	3,349,080	199 0	60.7	18 0	5 49	260	399 8	102 7	31.30	988 3	124.53	No	Yes	No
	Combustion Turbines A&B - 542 MMBtu/hr Peaking Unit	3	GPLSCTAB	625,030	3,349,080	33 0	10.1	13.7	4.18	1200	922 0	120 9	36.85	378.3	47 67	CON	Yes	Yes
	Unit 4: 170 MW CT1 with HRSG and duct burner	4	GPLSU4	625,030	3,349,080	121.0	36.9	16.8	5.12	186	358.7	73 8	22 49	113.2	14 26	CON	Yes	Yes
	Unit 5: 170 MW CT2 with HRSG and duct burner	5	GPLSU5	625,030	3,349,080	121.0	36.9	16 8	5.12	186	358 7	73.8	22 49	113.2	14.26	CON	Yes	Yes

TABLE 6-12
SSCE MILL BUILDING STRUCTURES CONSIDERED IN THE AIR MODELING ANALYSIS

Structure	Height		Length		Width	
	ft	m	ft	m	ft	m
Future Recover Boiler Building Cases						
Case 1 - Single Wall						
Recovery Boilers 1+2 (upper tier)	173	52.73	100	30.48	92	28.04
Recovery Boilers 1+2 (lower tier)	66	20.12	134	40.84	112	34.14
Recovery Boiler 1 ESP [b]	214	65.23	100	30.48	53	16.15
Recovery Boiler East Wall	173	52.73	134	40.84	0.2	0.06
Case 2 - Full Enclosure						
Recovery Boilers 1+2 [a]	173	52.73	134	40.84	112	34.14
Recovery Boiler 1 ESP [b]	214	65.23	50	15.24	53	16.15
Other Future Buildings						
Bleach Plant	71	21.64	123	37.47	78	23.77
Engineering & Maintenance	35	10.67	315	96.00	55	16.91
Offices/Storeroom	35	10.67	361	110.15	54	16.46
White Liquor Clarifier Tanks	29	8.69	199	60.78	90	27.42
Pulp Mill	83	25.30	352	107.40	193	58.96
Paper Mill	40	12.19	1,396	425.55	235	71.76
Combination Boilers Building	83	25.30	97	29.71	140	42.66
Recovery Boiler Cooling Tower (R)	38	11.58	75	22.95	63	19.12
Pulp Mill Cooling Tower (P)	38	11.58	75	22.95	63	19.13
ClO_2 Cooling Tower (C)	31	9.45	50	15.31	33	9.95
ClO_2 Building	81	24.71	95	29.07	50	15.31
PSD Baseline Only Buildings						
Power Boiler 6 Building[c]	150	45.72	35	10.52	53	16.01
Recovery Boilers 1+2 (upper tier)	173	52.73	100	30.48	92	28.04
Recovery Boilers 1+2 (lower tier)	66	20.12	134	40.84	112	34.14
Recovery Boiler 1 + 2 ESP [b]	214	65.23	100	30.48	53	16.15

Note: For a multiple-shaped structure, the length and width are based on the portion of the structure that has the maximum length or width. Length based on plant axis from southwest to northeast (40 degrees clockwise from north); width based on plant axis from northwest to southeast.

Footnotes:

[a] Reflects planned enclosure of the Recovery Boilers building.

[b] Sits atop the Recovery Boilers building.

[c] Existed during SO_2 baseline (1974) only.

TABLE 6-13
PSD CLASS II SIGNIFICANT IMPACT ANALYSIS FOR LIME KILN PETCOKE PROJECT

Pollutant	Averaging Time	Concentration [a] ($\mu g/m^3$)	Receptor Location [b] Easting (m)	Receptor Location [b] Northing (m)	Time Period (YYMMDDHH)	EPA Significant Impact Level ($\mu g/m^3$)
Case 1 - Recovery Boiler Building with 1 Wall to 173'						
SO_2	Annual	2.24	632,835	3,335,216	01123124	1
		2.97	632,835	3,335,216	02123124	
		2.15	632,835	3,335,216	03123124	
		2.42	632,835	3,335,216	04123124	
		2.46	632,835	3,335,216	05123124	
	24-hour	23.4	633,470	3,335,010	01070924	5
		23.2	632,835	3,335,216	02100324	
		24.7	633,470	3,334,910	03071124	
		30.1	633,570	3,334,910	04052524	
		28.0	632,835	3,335,216	05082824	
	3-hour	95.7	633,470	3,334,910	01072403	25
		80.0	633,470	3,334,910	02102121	
		121.3	633,470	3,334,910	03071124	
		143.2	633,570	3,334,910	04052524	
		125.1	633,570	3,334,910	05091803	
NO_2	Annual	3.46	632,835	3,335,216	01123124	1
		4.59	632,835	3,335,216	02123124	
		3.32	632,835	3,335,216	03123124	
		3.74	632,835	3,335,216	04123124	
		3.80	632,835	3,335,216	05123124	
Case 2 - Recovery Boiler Building Fully Enclosed						
SO_2	Annual	2.24	632,835	3,335,216	01123124	1
		2.97	632,835	3,335,216	02123124	
		2.15	632,835	3,335,216	03123124	
		2.41	632,835	3,335,216	04123124	
		2.45	632,835	3,335,216	05123124	
	24-hour	24.1	633,470	3,335,010	01070924	5
		23.2	632,835	3,335,216	02100324	
		25.3	633,470	3,334,910	03071124	
		30.7	633,570	3,334,910	04052524	
		28.0	632,835	3,335,216	05082824	
	3-hour	98.2	633,470	3,334,910	01072403	25
		82.9	633,470	3,334,910	02102121	
		124.0	633,470	3,334,910	03071124	
		145.7	633,570	3,334,910	04052524	
		126.6	633,570	3,334,910	05091803	
NO_2	Annual	3.46	632,835	3,335,216	01123124	1
		4.59	632,835	3,335,216	02123124	
		3.32	632,835	3,335,216	03123124	
		3.73	632,835	3,335,216	04123124	
		3.80	632,835	3,335,216	05123124	

Note: YY = Year; MM = Month; DD = Day; HH = Hour.

[a] Concentrations are predicted with AERMOD model and five years of surface meteorological data from the National Weather Service (NWS) station at Apalachicola Regional Airport and upper air soundings from the NWS station at Tallahasee, 2001 to 2005.

[b] UTM Coordinates in Zone 16, NAD27 Datum.

TABLE 6-14
PSD CLASS I SIGNIFICANT IMPACT ANALYSIS FOR LIME KILN PETCOKE PROJECT

Pollutant	Averaging Time	Concentration[a] (μg/m³) for Year			Proposed EPA Class I Significant Impact Level (μg/m³)
		2001	2002	2003	
Bradwell Bay NWA					
Sulfur Dioxide	Annual	0.0015	0.0010	0.0014	0.1
	24-hour	0.030	0.019	0.026	0.2
	3-hour	0.090	0.082	0.085	1.0
Nitrogen Dioxide	Annual	0.0022	0.0014	0.0021	0.1
Saint Marks NWA					
Sulfur Dioxide	Annual	0.0011	0.0008	0.0009	0.1
	24-hour	0.022	0.022	0.017	0.2
	3-hour	0.076	0.076	0.057	1.0
Nitrogen Dioxide	Annual	0.0014	0.0011	0.0011	0.1

[a] Based on the CALPUFF (5.711a) model and the 4-km VISTAS Domain for Florida, 2001-2003 .

TABLE 6-15
MAXIMUM SSCE/ACC SO_2 IMPACTS FOR VARIOUS COMBINATION BOILER EMISSION RATES

Combination Boiler Emission Limits (lb/hr)	Averaging Time	Concentration [a] (μg/m³)	Receptor Location [b] Easting (m)	Northing (m)	Time Period (YYMMDDHH)
Case 1 - Recovery Boilers Building With East Wall to 173'					
CB3 at 24-Hour Maximum					
CB3 - 887	HSH 24-hour	188	632,370	3,335,610	01112724
CB4 - 463		200	632,170	3,335,310	02090724
		200	632,370	3,335,410	03122924
		190	632,270	3,335,410	04101024
		231	632,270	3,335,410	05092324
BB4 at 24-Hour Maximum					
CB3 - 660	HSH 24-hour	187	632,370	3,335,610	01112724
CB4 - 690		206	632,170	3,335,310	02090724
		199	632,370	3,335,410	03122924
		189	632,270	3,335,410	04101024
		235	632,270	3,335,410	05092324
Case 2 - Recovery Boilers Building Fully Enclosed					
CB3 at 24-Hour Maximum					
CB3 - 887	HSH 24-hour	221	632,570	3,335,710	01112524
CB4 - 213		209	632,470	3,335,710	02071124
		230	632,470	3,335,810	03063024
		225	632,570	3,335,710	04012524
		233	632,470	3,335,710	05092524
CB4 at 24-Hour Maximum					
CB3 - 410	HSH 24-hour	202	632,570	3,335,710	01112524
CB4 - 690		203	632,470	3,335,710	02071124
		217	632,470	3,335,810	03063024
		208	632,570	3,335,710	04012524
		229	632,170	3,335,310	05092224
CB3 at 3-Hour Maximum					
CB3 - 887	HSH 3-hour	544	632,370	3,335,910	01041206
CB4 - 463		507	632,570	3,335,610	02092606
		619	632,470	3,335,810	03111809
		548	633,570	3,334,910	04021821
		514	632,470	3,335,810	05122718
CB4 at 3-Hour Maximum					
CB3 - 167	HSH 3-hour	496	632,470	3,335,610	01112412
CB4 - 1183		471	633,470	3,335,110	02060221
		555	632,470	3,335,810	03111809
		543	633,570	3,334,910	04021821
		507	632,370	3,335,710	05111506

Note: YY = Year; MM = Month; DD = Day; HH = Hour.

[a] Concentrations are predicted with AERMOD model and five years of surface meteorological data from the National Weather Service (NWS) station at Apalachicola Regional Airport and upper air soundings from the NWS station at Tallahasee, 2001 to 2005.

[b] UTM Coordinates in Zone 16, NAD27 Datum.

TABLE 6-16
MAXIMUM PREDICTED SO_2 IMPACTS FOR COMPARISON TO AAQS

Rank and Averaging Time	SO_2 Concentration ($\mu g/m^3$) [a] Total	Modeled Sources	Background	Receptor Location [b] Easting (m)	Northing (m)	Time Period (YYMMDDHH)	Florida AAQS ($\mu g/m^3$)
Case 1 - Recovery Boiler Building with 1 Wall to 173'							
Highest Annual	31.5	26.7	4.8	632,370	3,335,510	01123124	60
	32.4	32.4		632,270	3,335,310	02123124	
	27.7	27.7		630,120	3,338,360	03123124	
	27.1	27.1		632,270	3,335,410	04123124	
	29.3	29.3		630,120	3,338,360	05123124	
HSH 24-Hour	211.1	187.1	24	632,370	3,335,610	01112724	260
	207.1	207.1		632,170	3,335,310	02090724	
	199.2	199.2		632,370	3,335,410	03122924	
	190.0	190.0		632,270	3,335,410	04101024	
	235.0	235.0		632,170	3,335,310	05092224	
HSH 3-Hour	834	765	69	632,570	3,335,710	01101215	1,300
	803	803		632,270	3,335,610	02123112	
	898	898		632,270	3,335,510	03083109	
	804	804		632,270	3,335,510	04030518	
	815	815		632,370	3,335,610	05082906	
Case 2 - Recovery Boiler Building Fully Enclosed							
Highest Annual	30.6	25.8	4.8	632,470	3,335,610	01123124	60
	30.8	30.8		632,270	3,335,310	02123124	
	29.2	29.2		632,570	3,335,710	03123124	
	27.1	27.1		632,670	3,335,810	04123124	
	29.0	29.0		630,120	3,338,360	05123124	
HSH 24-Hour	244.9	220.9	24	632,570	3,335,710	01112524	260
	209.0	209.0		632,470	3,335,710	02071124	
	230.5	230.5		632,470	3,335,810	03063024	
	224.9	224.9		632,570	3,335,710	04012524	
	233.4	233.4		632,470	3,335,710	05092524	
HSH 3-Hour	613	544	69	632,370	3,335,910	01041206	1,300
	507	507		632,570	3,335,610	02092606	
	619	619		632,470	3,335,810	03111809	
	548	548		633,570	3,334,910	04021821	
	515	515		632,470	3,335,810	05122718	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

[a] Concentrations are predicted with AERMOD model and five years of surface meteorological data from the National Weather Service (NWS) station at Apalachicola Regional Airport and upper air soundings from the NWS station at Tallahassee, 2001 to 2005.

[b] UTM Coordinates in Zone 16, NAD27 Datum.

TABLE 6-17
MAXIMUM PREDICTED NO_2 IMPACTS FOR COMPARISON TO AAQS

Rank and Averaging Time	NO_2 Concentration (µg/m³) [a] Total	Modeled Sources	Background	Receptor Location [b] Easting (m)	Northing (m)	Time Period (YYMMDDHH)	Florida AAQS (µg/m³)
Case 2 - Recovery Boiler Building Fully Enclosed							
Highest Annual	29.1	15.1	14	632,470	3,335,610	01123124	100
	32.3	18.3	14	632,370	3,335,310	02123124	
	30.4	16.4	14	632,670	3,335,610	03123124	
	31.4	17.4	14	633,370	3,335,110	04123124	
	30.1	16.1	14	632,670	3,335,610	05123124	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

[a] Concentrations are predicted with AERMOD model and five years of surface meteorological data from the National Weather Service (NWS) station at Apalachicola Regional Airport and upper air soundings from the NWS station at Tallahasee, 2001 to 2005.

[b] UTM Coordinates in Zone 16, NAD27 Datum.

TABLE 6-18

MAXIMUM PREDICTED SO_2 IMPACTS FOR COMPARISON TO PSD CLASS II INCREMENTS

Rank and Averaging Time	Concentration (µg/m³) [a]	Receptor Location [b] Easting (m)	Northing (m)	Time Period (YYMMDDHH)	PSD Class II Increment (µg/m³)
Case 2 - Recovery Boiler Building Fully Enclosed					
Highest Annual	<0	0	0	01123124	20
	<0	0	0	02123124	
	<0	0	0	03123124	
	0.12	632,891	3,335,283	04123124	
	<0	0	0	05123124	
HSH 24-Hour	50.9	632,570	3,335,810	01100524	91
	68.5	632,470	3,335,810	02041524	
	78.0	632,470	3,335,810	03031924	
	68.4	632,470	3,335,810	04022024	
	71.9	632,470	3,335,910	05062724	
HSH 3-Hour	447	632,370	3,335,910	01072621	512
	393	632,470	3,335,810	02031924	
	394	632,470	3,335,910	03102421	
	386	632,470	3,335,810	04112321	
	372	632,470	3,335,810	05073103	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

[a] Concentrations are predicted with AERMOD model and five years of surface meteorological data from the National Weather Service (NWS) station at Apalachicola Regional Airport and upper air soundings from the NWS station at Tallahasee, 2001 to 2005.

[b] UTM Coordinates in Zone 16, NAD27 Datum.

TABLE 6-19
MAXIMUM PREDICTED NO_2 IMPACTS FOR COMPARISON TO PSD CLASS II INCREMENTS

Rank and Averaging Time	Concentration (µg/m³) [a]	Receptor Location [b]		Time Period (YYMMDDHH)	PSD Class II Increment (µg/m³)
		Easting (m)	Northing (m)		
Case 2 - Recovery Boiler Building Fully Enclosed					
Highest Annual	10.2	632,470	3,335,610	01123124	25
	12.1	632,370	3,335,310	02123124	
	11.1	632,570	3,335,710	03123124	
	12.5	633,370	3;335,110	04123124	
	11.9	633,370	3,335,110	05123124	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

[a] Concentrations are predicted with AERMOD model and five years of surface meteorological data from the National Weather Service (NWS) station at Apalachicola Regional Airport and upper air soundings from the NWS station at Tallahasee, 2001 to 2005.

[b] UTM Coordinates in Zone 16, NAD27 Datum

7.0 ADDITIONAL IMPACT ANALYSIS

7.1 Vicinity of SSCE Panama City Mill

EPA regulations contained in 40 CFR 52.21(o) require an analysis of "additional impacts", i.e., an analysis of the impacts on soils and vegetation, growth, and impairment to visibility that would occur as a result of the project. This section presents the required analysis for the Lime Kiln petcoke project.

7.1.1 Impacts to Vegetation and Soils

The area in the vicinity of the SSCE Panama City Mill is developed and cleared of native vegetation, with the exception of the approximately 10-acre western parcel on SSCE property, which is vegetated with a mixture of native trees and shrubs typical of the Gulf coast.

According to the USDA Soil Survey of Bay County, three soil types are found in the vicinity of the plant: Osier fine sand, Foxworth sand, and urban land. Osier fine sand is poorly drained, with moderately high organic matter content in the upper 6 inches. Foxworth sand is moderately well drained soil with low organic matter content. Urban land consists of areas that are ≥75 percent covered with streets, houses, industrial parks, commercial buildings, and other developments. Soils in these areas typically are comprised of undifferentiated soil material, with inclusions of other soil series that are too small to be mapped separately.

As described in the air quality impact analysis presented in Section 6.0, the maximum predicted SO_2 and NO_2 concentrations in the vicinity of the site as a result of the proposed project are below the AAQS. Since the AAQS are designed to protect the public welfare, including effects on soils and vegetation, no detrimental effects on soils or vegetation should occur in this area due to the proposed project.

7.1.2 Growth Impacts

The proposed petcoke project will not increase employment at the SSCE Panama City Mill. The only noticeable effect will be an increase in truck traffic (approximately 6 trucks per day on average) for the delivery of petcoke. Total pulp production or lime production at the Panama City Mill will not increase due to the proposed project, since it is only a fuel switch. The only new facilities, infrastructure, or support services needed will be the new petcoke storage and transport system. As a result, no significant impacts due to associated growth are expected due to the proposed project.

The potential impacts of SO_2 and NO_2 on soils, vegetation, and visibility in the Bradwell Bay and St. Marks PSD Class I areas are addressed in the following sections.

7.2 PSD Class I Areas

This section focuses on the ecological effects of the proposed facility's impacts on Air Quality Related Values (AQRV), as defined under PSD regulations, in the St. Marks National Wildlife Refuge and Bradwell Bay Wilderness Area. The location of these two Class I areas in relation to the Panama City Mill is shown in Figure 3-1.

The AQRVs are defined as being:

> "All those values possessed by an area except those that are not affected by changes in air quality and include all those assets of an area whose vitality, significance, or integrity is dependent in some way on the air environment. These values include visibility and those scenic, cultural, biological, and recreational resources of an area that are affected by air quality. Important attributes of an area are those values or assets that make an area significant as a monument, preserve, or primitive area. They are the assets that are to be preserved if the area is to achieve the purposes for which it was set aside" (Federal Register, 1978).

The AQRVs include freshwater and coastal wetlands, dominant plant communities, unique and rare plant communities, soils and associated periphyton, and the wildlife dependent on these communities for habitat. Rare, endemic, threatened, and endangered species of the wilderness areas and bioindicators of air pollution (e.g., lichens) are also evaluated.

The predicted increase in ambient concentrations at the Class I areas due to the proposed project were presented in Table 6-14. The increase in emissions used in the modeling analysis was shown in Tables 3-3 and 6-3.

7.2.1 Impacts to Soils

For soils, the potential and hypothesized effects of atmospheric deposition include:

- Increased soil acidification,
- Alteration in cation exchange,
- Loss of base cations, and
- Mobilization of trace metals.

The potential sensitivity of specific soils to atmospheric inputs is related to two factors. First, the physical ability of a soil to conduct water vertically through the soil profile is important in influencing the interaction with deposition. Second, the ability of the soil to resist chemical changes, as measured in terms of pH and soil cation exchange capacity (CEC), is important in determining how a soil responds to atmospheric inputs.

According to the USDA Soil Survey of Wakulla County, the soils of Bradwell Bay Wilderness Area are primarily Croatan-Dorovan mucks, while the primarily soil types in the St. Marks National Wildlife Refuge are Bayvi, Isles, and Estero soils. The Croatan-Dorovan mucks are very poorly drained with very high organic matter content. The Bayvi, Isles, and Estero soils are found in tidal marsh areas, are flooded daily by high tides, and have moderate organic matter content. The soils of both Bradwell Bay and St. Marks are generally classified as histosols. Histosols (peat soils) are organic and have extremely high buffering capacities based on their CEC, base saturation, and bulk density. Therefore, they would be relatively insensitive to atmospheric inputs.

The relatively low sensitivity of the soils to atmospheric inputs coupled with the extremely low ground-level concentrations of contaminants projected for the Bradwell Bay and St. Marks areas due to the SSCE Panama City Mill modification precludes any significant impact on soils.

7.2.2 Impacts to Vegetation

The maximum predicted gaseous concentrations ($\mu g/m^3$) of SO_2 and NO_2 were used in the determination of impacts on vegetation. These compounds are believed to interact predominantly with foliage and this is considered the major route of entry into plants. In this assessment, 100 percent of the compound of interest was assumed to interact with the vegetation.

Sulfur Dioxide

Sulfur is an essential plant nutrient usually taken up as sulfate ions by the roots from the soil solution. When sulfur dioxide in the atmosphere enters the foliage through pores in the leaves, it reacts with water in the leaf interior to form sulfite ions. Sulfite ions are highly toxic. They interact with enzymes, compete with normal metabolites, and interfere with a variety of cellular functions (Horsman and Wellburn, 1976). However, within the leaf, sulfite is oxidized to sulfate ions, which can then be used by the plant as a nutrient. Small amounts of sulfite may be oxidized before they prove harmful.

SO_2 gas at elevated levels has long been known to cause injury to plants. Acute SO_2 injury usually develops within a few hours or days of exposure, and symptoms include marginal, flecked, and/or intercostal necrotic areas that appear water-soaked and dullish green initially. This injury generally occurs to younger leaves. Chronic injury usually is evident by signs of chlorosis, bronzing, premature senescence, reduced growth, and possible tissue necrosis (EPA, 1982). Background levels of SO_2 range from 2.5 to 25 $\mu g/m^3$. Observed SO_2 effect levels for several plant species and plant sensitivity groupings are presented in Tables 7-1 and 7-2, respectively.

Many studies have been conducted to determine the effects of high-concentration, short-term SO_2 exposure on natural community vegetation. Sensitive plants include ragweed, legumes, blackberry, southern pine, and red and black oak. These species are injured by exposure to 3-hour SO_2 concentrations of 790 to 1,570 $\mu g/m^3$. Intermediate plants include locust and sweetgum. These species are injured by exposure to 3-hour SO_2 concentrations of 1,570 to 2,100 $\mu g/m^3$. Resistant species (injured at concentrations above 2,100 $\mu g/m^3$ for 3 hours) include white oak and dogwood (EPA, 1982).

A study of native Floridian species (Woltz and Howe, 1981) demonstrated that cypress, slash pine, live oak, and mangrove exposed to 1,300 $\mu g/m^3$ SO_2 for 8 hours were not visibly damaged. This finding support the levels cited by other researchers on the effects of SO_2 on vegetation. A corroborative study (McLaughlin and Lee, 1974) demonstrated that approximately 20 percent of a cross-section of plants ranging from sensitive to tolerant was visibly injured at 3-hour SO_2 concentrations of 920 $\mu g/m^3$.

Two lichen species indigenous to Florida exhibited signs of SO_2 damage in the form of decreased biomass gain and photosynthetic rate as well as membrane leakage when exposed to concentrations of 200 to 400 $\mu g/m^3$ for 6 hours/week for 10 weeks (Hart et al., 1988).

Both short-term and long-term increases in SO_2 emissions are expected as a result of the project, therefore the maximum predicted SO_2 concentrations were modeled for various averaging times. The maximum increase in 3-hour, 24-hour and annual SO_2 concentrations predicted within the Class I areas due to the project are only 0.09, 0.030, and 0.0015 $\mu g/m^3$, respectively. Regardless of the existing concentrations within the Class I areas, the predicted additional impacts caused by the proposed modification are predicted to be insignificant for SO_2. The modeled annual incremental increase in SO_2 (0.0015μg/m^3) adds only slightly to background levels of this gas and poses no threat to area vegetation.

Nitrogen Dioxide

Nitrogen dioxide (NO_2) in the atmosphere can injure plant tissue, with symptoms usually appearing as irregular white to brown collapsed lesions between the leaf veins and near the margins. Conversely, non-injurious levels of NO_2 can be absorbed by plants, enzymatically transformed into ammonia, and incorporated into plant constituents such as amino acids (Matsumaru et al., 1979).

Plant damage can occur through either acute (short-term, high concentration) or chronic (long-term, relatively low concentration) exposure. For plants that have been determined to be more sensitive to NO_2 exposure than others, acute (1, 4, 8 hours) exposure caused 5 percent predicted foliar injury at concentrations ranging from 3,800 to 15,000 μg/m^3 (Heck and Tingey, 1979). Chronic exposure of selected plants (some considered NO_2-sensitive) to NO_2 concentrations of 2,000 to 4,000 μg/m^3 for 213 to 1,900 hours caused reductions in yield of up to 37 percent and some chlorosis (Zahn, 1975).

Both short-term and long-term increases in NO_2 emissions are expected due to the project, therefore various averaging times were modeled. By comparison of published toxicity values for NO_2 exposure to short-term and long-term (annual averaging time) modeled concentrations, the possibility of plant damage in the Class I areas can be examined for acute and chronic exposure situations. For an acute exposure, the estimated 3-hour maximum NO_2 concentration due to the project only in the Class I areas is 0.13 μg/m^3, based on the annual NO_2 concentration of 0.0022 μg/m^3 and the ratio of 3-hour to annual average SO_2 concentrations from Table 6-14. This concentration is only 0.00003 to 0.00087 percent of the levels that foliar injury to sensitive in plant tissue.

For a chronic exposure, the annual estimated NO_2 concentration due to the project only at the point of maximum impact in the Class I areas (0.0022 μg/m^3) is 0.0001 to 0.0002 percent of the levels that caused minimal yield loss and chlorosis in plant tissue.

Although it has been shown that simultaneous exposure to SO_2 and NO_2 results in synergistic plant injury (Ashenden and Williams, 1980), the magnitude of this response is generally only 3 to 4 times greater than either gas alone, and usually occurs at unnaturally high levels of each gas. Therefore, the predicted increase in concentrations within the Class I areas are still far below the levels that potentially cause plant injury for either acute or chronic exposure.

Summary

In summary, the phytotoxic effects from the increase in emissions due to the proposed project are predicted to be minimal. It is important to note that the concentrations were conservatively modeled with the assumption that 100 percent was available for plant uptake. This is rarely the case in a natural ecosystem.

7.2.3 Impacts to Wildlife

A wide range of physiological and ecological effects to fauna has been reported for gaseous and particulate pollutants (Newman, 1981; Newman and Schreiber, 1988). The most severe of these effects have been observed at concentrations above the secondary ambient air quality standards. Physiological and behavioral effects have been observed in experimental animals at or below these standards. No observable effects to fauna are expected at concentrations below the values reported in Table 7-3.

The major air quality risk to wildlife in the United States is from continuous exposure to pollutants above the National Ambient Air Quality Standards. This occurs in non-attainment areas; e.g., Los Angeles Basin. Risks to wildlife also may occur for wildlife living in the vicinity of an emission source that experiences frequent upsets or episodic conditions resulting from malfunctioning equipment, unique meteorological conditions, or startup operations (Newman and Schreiber, 1988). Under these conditions, chronic effects (e.g., particulate contamination) and acute effects (e.g., injury to health) have been observed (Newman, 1981).

For impacts on wildlife, the lowest threshold values of SO_2, NO_x, and particulates which are reported to cause physiological changes are shown in Table 7-3. These values are up to orders of magnitude larger than the maximum predicted increase in concentrations for the Class I area. No effects on wildlife AQRVs from SO_2 or NO_2 are expected. These results are considered indications of the risk of other air pollutant emissions predicted from the facility.

7.2.4 Impacts on Visibility

The CAA Amendments of 1977 provide for implementation of guidelines to prevent visibility impairment in mandatory Class I areas. The guidelines are intended to protect the aesthetic quality of these pristine areas from reduction in visual range and atmospheric discoloration due to various pollutants. Visibility can take the form of plume blight for nearby areas (i.e., distances within 50 km) or regional haze for long distances (i.e., distances beyond 50 km).

Sources of air pollution can cause visible plumes if emissions of PM_{10} and NO_x are sufficiently large. A plume will be visible if its constituents scatter or absorb sufficient light so that the plume is brighter or darker than its viewing background (e.g., the sky or a terrain feature, such as a mountain). PSD Class I areas, such as national parks and wilderness areas, are afforded special visibility protection designed to prevent plume visual impacts to observers within a Class I area.

Visibility is an AQRV for the St. Marks NWA. Because the nearest distance from the SSCE Mill site to the St. Marks NWA is about 112 km, the change in visibility for the proposed Lime Kiln petcoke project was analyzed as regional haze.

Currently, there are several air quality modeling approaches recommended by the Interagency Workgroup on Air Quality Models (IWAQM) to perform these analyses. The IWAQM consists of EPA and FLM of Class I areas that are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized in guidelines required by the 1977 Clean Air Act Amendments and are contained in two documents:

- Interagency Workgroup on Air Quality Models (IWAQM), Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts (EPA, 1998), referred to as the IWAQM Phase 2 report; and
- Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Phase I Report, USFS, NPS, USFWS (December, 2000), referred to as the FLAG document.

The methods and assumptions recommended in these documents were used to assess visibility impairment due to the proposed SSCE project.

Based on the FLAG document, current regional haze guidelines characterize a change in visibility by the change in the light-extinction coefficient (b_{ext}). The b_{ext} is the attenuation of light per unit distance due to the scattering and absorption by gases and particles in the atmosphere. A change in the extinction coefficient produces a perceived visual change. An index that simply quantifies the percent change in visibility due to the operation of a source is calculated as:

$$\Delta\% = (b_{exts} / b_{extb}) \times 100$$

where: b_{exts} is the extinction coefficient calculated for the source, and

b_{extb} is the background extinction coefficient.

The purpose of the visibility analysis is to calculate the extinction at each receptor for each day (24-hour period) of the year due to the proposed Lime Kiln petcoke project emission increases only. The emissions used in the visibility analysis are the same as those shown in Table 6-3 for the proposed project. The criteria to determine if the proposed project's impacts are potentially significant are based on a change in extinction of 5 percent or greater for any day of the year.

Processing of visibility impairment for this study was performed with the CALPUFF model and the CALPUFF post-processing program CALPOST. The analysis was conducted in accordance with the most recent guidance from the FLAG report (December 2000). The CALPUFF postprocessor model CALPOST is used to calculate the combined visibility effects from the different pollutants that are emitted from the proposed project. Daily background extinction coefficients are calculated on an hour-by-hour basis using hourly relative humidity data from CALMET and hygroscopic and non-hygroscopic extinction components specified in the FLAG document. For the Class I area evaluated, the hygroscopic and non-hygroscopic components are 0.9 and 8.5 inverse mega meter (Mm^{-1}). CALPOST then predicts the percent extinction change for each day of the year.

Results

Since visibility is not an AQRV at the Bradwell Bay NWA, the impacts were predicted only at the Saint Marks NWA. The maximum visibility impairment predicted for the proposed project is shown in Table 7-4. Results are presented for Method 2 (hourly relative humidity) with a relative humidity cap of 95 percent, and for the highest predicted concentration from Method 6. As shown in Table 7-4, the maximum predicted 24-hour visibility impairment due to the proposed project is 0.88 percent using Method 2 and 0.44 percent using Method 6. These results are well below the FLM's 5 percent project-only visibility criteria.

Therefore, it is concluded that the proposed project will not pose a significant impact on the visibility at the St. Marks NWR PSD Class I area.

7.2.5 Deposition Methodology

As part of the AQRV analyses, total nitrogen (N) and sulfur (S) deposition rates were predicted at the St. marks and Bradwell Bay Class I areas. The deposition analysis thresholds (DAT) are based on the annual averaging period. The total deposition is estimated in units of kilogram per hectare per year (kg/ha/yr) of nitrogen or sulfur. The CALPUFF model is used to predict wet and dry deposition fluxes of various oxides of these elements.

For N deposition, the species include:

- Particulate ammonium nitrate (from species NO_3), wet and dry deposition;
- Nitric acid (species HNO_3), wet and dry deposition;
- NO_x, dry deposition; and
- Ammonium sulfate (species SO_4), wet and dry deposition.

For S deposition, the species include:

- SO_2, wet and dry deposition; and
- SO_4, wet and dry deposition.

The CALPUFF model produces results in units of $\mu g/m^2/s$. The modeled deposition rates are then converted to N or S deposition in kg/ha, respectively, by using a multiplier equal to the ratio of the molecular weights of the substances (IWAQM Phase II report Section 3.3).

Deposition analysis thresholds (DAT) for nitrogen and sulfur deposition of 0.01 kg/ha/yr were provided by the U.S. Fish and Wildlife Service (USFWS) (January 2002). A DAT is the additional amount of N or S deposition within a Class I area, below which estimated impacts from a new or modified source are considered insignificant. The maximum N and S depositions predicted for the proposed Lime Kiln petcoke project are, therefore, compared to these DAT or significant impact levels.

Results

The maximum predicted N and S depositions due to the proposed project are presented in Table 7-5. The maximum N and S depositions are predicted to be well below the N and S significant impact levels of 0.01 kg/ha/yr, respectively, at each evaluated PSD Class I area.

TABLE 7-1
SO_2 EFFECTS LEVELS FOR VARIOUS PLANT SPECIES

Plant Species	Observed Effect Level ($\mu g/m^3$)	Exposure (Time)	Reference
Sensitive to tolerant	920 (20 percent displayed visible injury)	3 hours	McLaughlin and Lee, 1974
Lichens	200-400	6 hr/wk for 10 weeks	Hart *et al.*, 1988
Cypress, slash pine, live oak, mangrove	1,300	8 hours	Woltz and Howe, 1981
Jack pine seedlings	470-520	24 hours	Malhotra and Kahn, 1978
Black oak	1,310	Continuously for 1 week	Carlson, 1979

TABLE 7-2
SENSITIVITY GROUPINGS OF VEGETATION BASED ON VISIBLE INJURY AT DIFFERENT SO_2 EXPOSURES[a]

Sensitivity Grouping	SO_2 Concentration		Plants
	1-Hour	3-Hour	
Sensitive	1,310 - 2,620 µg/m^3 (0.5 - 1.0 ppm)	790 - 1,570 µg/m^3 (0.3 - 0.6 ppm)	Ragweeds Legumes Blackberry Southern pines Red and black oaks White ash Sumacs
Intermediate	2,620 - 5,240 µg/m^3 (1.0 - 2.0 ppm)	1,570 - 2,100 µg/m^3 (0.6 - 0.8 ppm)	Maples Locust Sweetgum Cherry Elms Tuliptree Many crop and garden species
Resistant	>5,240 µg/m^3 (>2.0 ppm)	>2,100 µg/m^3 (>0.8 ppm)	White oaks Potato Upland cotton Corn Dogwood Peach

[a] Based on observations over a 20-year period of visible injury occurring on over 120 species growing in the vicinities of coal-fired power plants in the southeastern United States.

Source: EPA, 1982a.

TABLE 7-3
EXAMPLES OF REPORTED EFFECTS OF AIR POLLUTANTS AT CONCENTRATIONS BELOW NATIONAL SECONDARY AMBIENT AIR QUALITY STANDARDS

Pollutant	Reported Effect	Concentration ($\mu g/m^3$)	Exposure
Sulfur Dioxide[1]	Respiratory stress in guinea pigs	427 to 854	1 hour
	Respiratory stress in rats	267	7 hours/day; 5 day/week for 10 weeks
	Decreased abundance in deer mice	13 to 157	continually for 5 months
Nitrogen Dioxide[2,3]	Respiratory stress in mice	1,917	3 hours
	Respiratory stress in guinea pigs	96 to 958	8 hours/day for 122 days
Particulates[1]	Respiratory stress, reduced respiratory disease defenses	120 PbO_3	continually for 2 months
	Decreased respiratory disease defenses in rats, same with hamsters	100 $NiCl_2$	2 hours

Source: [1]Newman and Schreiber, 1988.
[2]Gardner and Graham, 1976.
[3]Trzeciak et al., 1977.

TABLE 7-4
MAXIMUM 24-HOUR AVERAGE VISIBILITY IMPAIRMENT PREDICTED FOR THE SCCE LIME KILN PETCOKE PROJECT
AT THE SAINT MARKS NWA PSD CLASS I AREA

Area	Visibility Impairment (%) [a]			Visibility Impairment Criteria (%)
	2001	2002	2003	
BACKGROUND EXTINCTION CALCULATIONS: METHOD 2 WITH RHMAX = 95 PERCENT				
Saint Marks NWA	0.88	0.59	0.72	5.0
BACKGROUND EXTINCTION CALCULATIONS: METHOD 6 WITH MONTHLY F(RH) FACTORS - HIGHEST				
Saint Marks NWA	0.43	0.30	0.44	5.0

[a] Concentrations are highest predicted using the VISTAS 4-km Florida Domains, 2001 to 2003.
Background extinctions calculated using FLAG Document (December 2000) and stated method
NWA = National Wilderness Area

TABLE 7-5
TOTAL SULFUR AND NITROGEN DEPOSITION RATES PREDICTED FOR THE SCCE LIME KILN PETCOKE PROJECT AT THE BRADWELL BAY AND SAINT MARKS NWA PSD CLASS I AREAS

PSD Class I Area	Total Deposition (Wet + Dry) for Year						Deposition Analysis Threshold[b]
	2001		2002		2003		
	($g/m^2/s$)	(kg/ha/yr)	($g/m^2/s$)	(kg/ha/yr)	($g/m^2/s$)	(kg/ha/yr)	(kg/ha/yr)
Sulfur Deposition							
Bradwell Bay NWA	5.390E-12	0.0017	3.059E-12	0.0010	4.165E-12	0.0013	0.01
Saint Marks NWA	3.92E-12	0.0012	2.10E-12	0.0007	2.69E-12	0.0008	0.01
Nitrogen Deposition							
Bradwell Bay NWA	4.812E-12	0.0015	2.843E-12	0.0009	4.085E-12	0.0013	0.01
Saint Marks NWA	3.160E-12	0.0010	1.858E-12	0.0006	2.276E-12	0.0007	0.01

[a] Conversion factor is used to convert $g/m^2/s$ to kg/hectare (ha)/yr using following units:

$g/m^2/s$	x	0.001	kg/g
	x	10000	m^2/hectare
	x	3600	sec/hr
	x	8760	hr/yr =kg/ha/yr
	or		
$g/m^2/s$	x	3.1536E+08	= kg/ha/yr

[b] Deposition analysis thresholds (DAT) for nitrogen and sulfur deposition provided by the U.S. Fish and Wildlife Service, January 2002. A DAT is the additional amount of N or S deposition within a Class I area, below which estimated impacts from a proposed new or modified source are considered insignificant.

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APPENDIX A

PAST ACTUAL EMISSION CALCULATIONS FOR THE LIME KILN

TABLE A-1
PAST ACTUAL ANNUAL (1997-2006) EMISSION FACTORS FROM ANNUAL OPERATING REPORTS FOR THE LIME KILN, SSCE PANAMA CITY

Source Description	Annual Operation (hr/yr)	Annual Process/Fuel	Factor Units	Pollutant Emission Factors[A] SO_2	NO_x	CO	PM	PM_{10}	VOC	TRS
Lime Kiln										
1997 Actual Emission Factors										
--*Sulfate (Kraft) Pulping*	8,388	666,002 tons ADUP	lb/ton ADUP	0.300 [B]	1.0 [B]	0.100 [B]			0.250 [B]	
			lb/hr				21.63 [C]	3.61 [D]		
			ppm at 10% O_2							10.56 [E]
			dscfm							45,000 [F]
--*Lime Manufacture*		168,454 tons Lime								
--*Residual Oil*		3,598.6 10^3 gallons								
--*Natural Gas*		275.1 10^6 ft^3								
1998 Actual Emission Factors										
--*Sulfate (Kraft) Pulping*	5,606	445,364 tons ADUP	lb/ton ADUP	0.300 [B]	1.0 [B]	0.100 [B]			0.250 [B]	
			lb/hr				21.63 [D]	3.61 [D]		
			ppm at 10% O_2							5.07 [E]
			dscfm							45,000 [F]
--*Lime Manufacture*		98,736 tons Lime								
--*Residual Oil*		4,211.7 10^3 gallons								
--*Natural Gas*		119.8 10^6 ft^3								
1999 Actual Emission Factors										
--*Sulfate (Kraft) Pulping*	8,380	667,327 tons ADUP	lb/ton ADUP	0.300 [B]	1.000 [B]	0.100 [B]			0.250 [B]	
			lb/hr				29.4 [G]	27.8 [G]		
			ppm at 10% O_2							2.34 [E]
			dscfm							45,000 [F]
--*Lime Manufacture*		135,802 tons Lime								
--*Residual Oil*		7,045.0 10^3 gallons								
--*Natural Gas*		109.7 10^6 ft^3								
2000 Actual Emission Factors										
--*Sulfate (Kraft) Pulping*	7,879	115,415 tons Lime	lb/ton Lime	0.286 [B]	7.9 [B]	0.366 [B]				
			lb/hr				25.3 [G]	22.? [G]	27.4 [G]	
			ppm at 10% O_2							2.32 [E]
			dscfm							45,000 [F]
--*Residual Oil*		601,236 tons ADUP								
--*Lime Manufacture*		5,219.0 10^3 gallons								
--*Natural Gas*		302.8 10^6 ft^3								
2001 Actual Emission Factors										
--*Lime Manufacture*	7,959	127,518 tons Lime	lb/ton Lime	0.286 [B]	7.9 [B]	0.366 [B]	1.38 [B]	1.38 [B]	0.236 [B]	
			ppm at 10% O_2							2.8 [E]
			dscfm							45,000 [F]
--*Sulfate (Kraft) Pulping*		624,401 tons ADUP								
--*Residual Oil*		6,647.0 10^3 gallons								
--*Natural Gas*		99.1 10^6 ft^3								
2002 Actual Emission Factors										
--*Lime Manufacture*	8,208	132,432 tons Lime	lb/ton Lime	0.286 [B]	7.9 [B]	0.366 [B]	1.38 [B]	1.38 [B]	0.236 [B]	
			ppm at 10% O_2							2.8 [E]
			dscfm							45,000 [F]
--*Sulfate (Kraft) Pulping*		667,776 tons ADUP								
--*Residual Oil*		7,231.0 10^3 gallons								
--*Natural Gas*		30.3 10^6 ft^3								
2003 Actual Emission Factors										
--*Lime Manufacture*	8,608	113,752 tons Lime	lb/ton Lime	0.286 [B]	7.9 [B]	0.366 [B]	1.38 [B]	1.38 [B]	0.236 [B]	
			ppm at 10% O_2							2.6 [E]
			dscfm							45,000 [F]
--*Sulfate (Kraft) Pulping*		583,167 tons ADUP								
--*Residual Oil*		5,796.7 10^3 gallons								
--*Natural Gas*		11.7 10^6 ft^3								
2004 Actual Emission Factors										
--*Lime Manufacture*	8,129	134,961 tons Lime	lb/ton Lime	0.286 [B]	7.9 [B]	0.366 [B]	1.38 [B]	1.38 [B]	0.236 [B]	
			ppm at 10% O_2							2.9 [E]
			dscfm							45,000 [F]
--*Sulfate (Kraft) Pulping*		667,498 tons ADUP								
--*Residual Oil*		6,344.1 10^3 gallons								
--*Natural Gas*		19.7 10^6 ft^3								
2005 Actual Emission Factors										
--*Lime Manufacture*	7,997	[illegible] tons Lime	lb/ton Lime	0.286 [B]	7.9 [B]	0.366 [B]	1.38 [B]	1.38 [B]	0.236 [B]	
			ppm at 10% O_2							1.2 [E]
			dscfm							45,000 [F]
--*Sulfate (Kraft) Pulping*		646,729 tons ADUP								
--*Residual Oil*		6,271.6 10^3 gallons								
--*Natural Gas*		9.8 10^6 ft^3								
2006 Actual Emission Factors[H]										
--*Lime Manufacture*	8,143	158,130 tons Lime	lb/ton Lime							
--*Sulfate (Kraft) Pulping*		680,447 tons ADUP								
--*Residual Oil*		6,301.9 10^3 gallons								
--*Natural Gas*		9.5 10^6 ft^3								

[A] SAM, Lead, Mercury, and Fluorides are not reported in the facility Annual Operating Reports (AORs).
[B] Emission factor used in the facility AOR.
[C] Reported in the facility AOR as pounds per hour (lb/hr).
[D] Assumed to be 16.7% of the total PM reported in the facility AOR.
[E] Reported in the facility AOR as ppm from CEM.
[F] Assumed flow rate reported in the facility AOR.
[G] Reported in the facility AOR in tons per year (TPY), and was divided by the operating hours and multiplied by 2,000 pounds per ton to get lb/hr.
[H] 2006 facility AORs had not been submitted as of January, 2007.

TABLE A-3
REVISED EMISSION FACTORS USED TO DETERMINE PAST ACTUAL ANNUAL EMISSIONS (1997-2006) FOR THE LIME KILN, SSCE PANAMA CITY

Source Description	Annual Operation (hr/yr)	Annual Process/Fuel	Factor Units	Pollutant Emission Factors: SO_2	NO_x	CO	PM	PM_{10}	VOC	TRS	SAM	Lead	Mercury	Fluorides
Lime Kiln														
1997 Actual Emission Factors	8,388	160,454 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				25.48 [A]	22.27 [H]						
			ppm @ 10% O_2							10.56 [I]				
			dscfm @ 10% O_2							66,284 [J]				
1998 Actual Emission Factors	5,606	98,736 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				28.49 [A]	23.15 [H]						
			ppm @ 10% O_2							5.07 [I]				
			dscfm @ 10% O_2							66,284 [J]				
1999 Actual Emission Factors	8,300	135,802 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				33.51 [A]	22.30 [H]						
			ppm @ 10% O_2							2.34 [I]				
			dscfm @ 10% O_2							66,284 [J]				
2000 Actual Emission Factors	7,879	115,415 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				22.24 [G]	19.44 [H]						
			ppm @ 10% O_2							2.32 [I]				
			dscfm @ 10% O_2							66,284 [J]				
2001 Actual Emission Factors	7,959	127,518 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				20.29 [G]	17.73 [H]						
			ppm @ 10% O_2							2.00 [I]				
			dscfm @ 10% O_2							66,284 [J]				
2002 Actual Emission Factors	8,208	132,437 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				17.42 [G]	15.23 [H]						
			ppm @ 10% O_2							2.80 [I]				
			dscfm @ 10% O_2							66,284 [J]				
2003 Actual Emission Factors	8,600	118,752 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				17.42 [G]	15.23 [H]						
			ppm @ 10% O_2							2.68 [I]				
			dscfm @ 10% O_2							66,284 [J]				
2004 Actual Emission Factors	8,128	154,961 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				17.42 [G]	15.23 [H]						
			ppm @ 10% O_2							2.900 [I]				
			dscfm @ 10% O_2							66,284 [J]				
2005 Actual Emission Factors	7,997	160,068 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				17.42 [G]	15.23 [H]						
			ppm @ 10% O_2							3.20 [I]				
			dscfm @ 10% O_2							66,284 [J]				
2006 Actual Emission Factors	8,143	158,130 tons Lime	lb/ton Lime	0.286 [A]	2.316 [B]	0.181 [C]			0.046 [C]		0.021 [D]	0.0032 [E]	6.2E-07 [E]	- [F]
			lb/hr				17.42 [G]	15.23 [H]						
			ppm @ 10% O_2							4.41 [K]				
			dscfm @ 10% O_2							66,284 [J]				

[A] Emission factor used in the facility Annual Operating Report (AOR). See Table A-1
[B] Emission factor calculated from stack testing performed by Weston Solutions on February 28, 2006
[C] Emission factor obtained from the NCASI Technical Bulletin No. 884, Table 4.13, mean value.
[D] Emission factor obtained from the NCASI Technical Bulletin No. 858, Table 16A, footnote 3 (mean value for lime kilns firing No. 6 fuel oil and NCGs)
[E] Emission factor obtained from the NCASI Technical Bulletin No. 858, Table 16C, mean value.
[F] No emission factors available for fluorides emitted from kraft lime kilns
[G] Five year average PM emission value from stack testing. See Table A-5
[H] Emission factor is 87.4% of PM, obtained from NCASI "Particulate Emission Data for Pulp and Paper Industry Specific Sources" (August 25, 2006)
[I] Concentration reported in the facility AOR from CEM data. See Table A-1
[J] Average flue gas flowrate (dscfm corrected to 10% O_2) from the previous two-year period. See Table A-5
[K] Concentration reported from CEM data.

TABLE A-3
BASELINE ACTUAL EMISSIONS FROM LIME KILN, SSCE PANAMA CITY MILL

Source Description	EU ID	Pollutant Emission Rate (TPY)[a]										
		SO_2	NO_x	CO	PM	PM_{10}	VOC	TRS	SAM	Lead	Mercury	Fluorides
Lime Kiln	004											
1997 Actual Emissions		24.1	195.1	15.2	106.9	93.4	3.9	15.5	1.77	0.27	5.2E-05	-
1998 Actual Emissions		14.1	114.3	8.9	74.3	64.9	2.3	5.0	1.04	0.16	3.1E-05	-
1999 Actual Emissions		19.4	157.3	12.3	106.9	93.4	3.1	3.4	1.43	0.22	4.2E-05	-
2000 Actual Emissions		16.5	133.7	10.4	87.6	76.6	2.7	3.2	1.21	0.18	3.6E-05	-
2001 Actual Emissions		18.2	147.7	11.5	80.7	70.6	2.9	3.9	1.34	0.20	4.0E-05	-
2002 Actual Emissions		18.9	153.4	12.0	71.5	62.5	3.0	4.0	1.39	0.21	4.1E-05	-
2003 Actual Emissions		17.0	137.5	10.7	75.0	65.5	2.7	3.9	1.25	0.19	3.7E-05	-
2004 Actual Emissions		22.2	179.5	14.0	70.8	61.9	3.6	4.1	1.63	0.25	4.8E-05	-
2005 Actual Emissions		22.9	185.4	14.5	69.7	60.9	3.7	4.5	1.68	0.26	5.0E-05	-
2006 Actual Emissions		22.6	183.1	14.3	70.9	62.0	3.6	6.3	1.66	0.25	4.9E-05	-

TPY = Tons per year.

Notes:
[a] See Table A-2 for emission factors and operating data.

TABLE A-4
SUMMARY OF BASELINE 2-YEAR AVERAGE ACTUAL EMISSIONS FROM LIME KILN, SSCE PANAMA CITY MILL

Source Description	Pollutant Emission Rate (TPY) [a]										
	SO_2	NO_x	CO	PM	PM_{10}	VOC	TRS	SAM	Lead	Mercury	Fluorides
<u>Lime Kiln</u>											
1997 - 1998 Average Emissions	19.1	154.7	12.1	90.6	79.2	3.07	10.3	1.40	0.214	4.14E-05	-
1998 - 1999 Average Emissions	16.8	135.8	10.6	90.6	79.2	2.70	4.2	1.23	0.188	3.64E-05	-
1999 - 2000 Average Emissions	18.0	145.5	11.4	97.3	85.0	2.89	3.3	1.32	0.201	3.89E-05	-
2000 - 2001 Average Emissions	17.4	140.7	11.0	84.2	73.6	2.79	3.6	1.28	0.194	3.77E-05	-
2001 - 2002 Average Emissions	18.6	150.5	11.8	76.1	66.5	2.99	4.0	1.36	0.208	4.03E-05	-
2002 - 2003 Average Emissions	18.0	145.4	11.4	73.3	64.0	2.89	4.0	1.32	0.201	3.89E-05	-
2003 - 2004 Average Emissions	19.6	158.5	12.4	72.9	63.7	3.15	4.0	1.44	0.219	4.24E-05	-
2004 - 2005 Average Emissions	22.5	182.4	14.3	70.2	61.4	3.62	4.3	1.65	0.252	4.88E-05	-
2005 - 2006 Average Emissions	22.8	184.2	14.4	70.3	61.4	3.66	5.4	1.67	0.255	4.93E-05	-
Average Actual Emissions of Highest 2-Year Period											
	<u>'05-'06</u>	**<u>'05-'06</u>**	**<u>'05-'06</u>**	**<u>'99-'00</u>**	**<u>'99-'00</u>**	**<u>'05-'06</u>**	**<u>'97-'98</u>**	**<u>'05-'06</u>**	**<u>'05-'06</u>**	**<u>'05-'06</u>**	**<u>--</u>**
--Total	**22.8**	**184.2**	**14.4**	**97.3**	**85.0**	**3.66**	**10.3**	**1.67**	**0.255**	**4.93E-05**	**-**

TPY = Tons per year.

Notes:
[a] See Table A-2 for emission factors.

TABLE A-5
EMISSIONS AND PLANT OPERATING DATA FOR LIME KILN STACK TESTS

Test Date	Flue Gas Temperature (°F)	Flue Gas Flowrate (dscfm)	Flue Gas Flowrate (acfm)	Lime (CaO) Production (ton/hr)	Moisture (%)	Oxygen (%)	Corrected Flue Gas Flowrate @ 10% O_2 (dscfm)	Pollutant	Emission Rate	5-Yr Period	5-Yr Average PM (lb/hr)
1997	--	--	--	--	--	--	--	PM	21.6 lb/hr	1997 - 2001	25.48
1998	163.1	48,887	85,958	--	33.1	6.5	64,442	PM	28.49 lb/hr	1998 - 2002	26.49
								TRS	2.2 ppm @ 10% O_2		
1999	167.9	58,145	104,176	--	34.0	5.6	81,403	PM	28.77 lb/hr	1999 - 2003	25.51
								TRS	0.71 ppm @ 10% O_2		
2000	168.6	49,986	91,109	--	34.7	6.1	67,709	PM	22.72 lb/hr	2000 - 2004	22.24
								TRS	0.94 ppm @ 10% O_2		
2001	167.7	50,982	91,684	--	34.2	6.7	66,277	PM	25.84 lb/hr	2001 - 2005	20.29
								TRS	1.37 ppm @ 10% O_2		
2002	165.4	53,066	93,285	--	32.7	6.6	69,468	PM	26.635 lb/hr	2002 - 2006	17.42
								TRS	2.54 ppm @ 10% O_2		
2002	--	53,159	--	14.07	--	7.2	66,908	SO_2	5.58 lb/hr	--	--
2003	172.1	52,203	105,567	--	40.0	8.3	60,271	PM	23.6 lb/hr	2002 - 2006	17.42
2004	162.3	27,629	48,275	19.54	32.8	8.1	32,401	PM	12.393 lb/hr	2002 - 2006	17.42
								TRS	0.459 ppm @ 10% O_2		
2005	164.0	26,385	48,590	--	35.7	7.6	32,142	PM	12.979 lb/hr	2002 - 2006	17.42
								TRS	7.71 ppm @ 10% O_2		
2006	166.3	44,475	80,958	20.0	34.6	7.2	55,796	PM	11.515 lb/hr	2002 - 2006	17.42
								TRS	3.34 ppm @ 10% O_2		
2006	160.0	52,378	89,526	15.5	31.7	7.5	64,282	SO_2	0.5 lb/hr	--	--
								NO_X	35.6 lb/hr	--	--
Average[a] =	166.4	51,476	92,783		34.4	6.9	66,284				
Maximum[a] =	172.1	58,145	105,567		40.0	8.3	81,403				
Minimum[a] =	160.0	44,475	80,958		31.7	5.6	55,796				

[a] Excluding 2004 and 2005, which appear to be anomalous.

TABLE A-6
PAST ACTUAL OPERATING CONDITIONS OF LIME KILN

Year	Plant Operation (hours)	Heat Input Rate (MMBtu/yr)[a]	Lime Production (ton CaO/yr)	2-Year Period	2-Year Average Plant Operation (hours)	2-Year Average Heat Input Rate (MMBtu/yr)	2-Year Average Lime Production (ton CaO/yr)
1997	8,388	1,114,908	168,454	--	--	--	--
1998	5,606	751,522	98,736	1997 - 1998	6,997	933,215	133,595
1999	8,380	1,166,450	135,802	1998 - 1999	6,993	958,986	117,269
2000	7,879	1,085,650	115,415	1999 - 2000	8,130	1,126,050	125,609
2001	7,959	1,096,170	127,518	2000 - 2001	7,919	1,090,910	121,467
2002	8.208	1,114,920	132,432	2001 - 2002	8,084	1,105,545	129,975
2003	8.608	880,925	118,752	2002 - 2003	8,408	997,923	125,592
2004	8,128	971,355	154,961	2003 - 2004	8,368	926,140	136,857
2005	7,997	951,140	160,068	2004 - 2005	8,063	961,248	157,515
2006	8,143	954,810	158,130	2005 - 2006	8,070	952,975	159,099
				Average Actual Operating Conditions of Highest 2-Year Period			
					'02-'03	**'99-'00**	**'05-'06**
--Total					**8,408**	**1,126,050**	**159,099**

[a] Heat input rates based on 150,000 Btu/gal for fuel oil, and 1,000 Btu/ft^3 for natural gas. See Table A-1 for fuel usage amounts.

[b] Fuel usage rates for 1997 unavailable

APPENDIX B

POTENTIAL EMISSION CALCULATIONS FOR THE LIME KILN AND OTHER PROJECT-AFFECTED SOURCES

4.12 Lime Kilns

Just as for kraft recovery furnaces, TRS and particulate matter (PM) emissions from lime kilns received all of the attention until recent years, because of their readily observable nature (odor and visibility). Besides these emissions, other significant emissions from the kiln include SO_2, NO_x, and total hydrocarbons (THCs).

4.12.1 *Particulate Emissions*

While passing through the kiln, the combustion gases pick up a good deal of particulate matter both from lime mud dust formation and from alkali vaporization. This PM must be removed before the gases exit to the atmosphere. Mechanical devices such as dust chambers or cyclones are generally used to remove larger particles, which are mainly calcium-containing. A wet scrubber or electrostatic precipitator follows for removal of smaller particulates, which are mainly sodium sulfate and sodium carbonate and have aerodynamic diameters less than 10 μm. The following analysis of speciated particulate matter emissions from one lime kiln equipped with a wet scrubber was obtained (USEPA 1990): 34.68% Na, 47.20% SO_4, 1.3% F, 2.63% Cl, 1.28% K, 10.12 % OC (organic C), 0.39% Ca, rest <0.5% or less. This confirms that a majority of the PM emissions from a lime kiln comprise Na_2SO_4 or Na_2CO_3.

EPA has developed source measurement methods for PM_{10} (Method 201A), $PM_{2.5}$ (a modification of Method 201A) and condensible particulate matter (CPM) (EPA Method 202). However, all these methods were designed primarily for stacks following dry PM control devices. A significant fraction of the stacks on combustion sources in the pulp and paper industry are considered wet sources. Thus, EPA M201A cannot be used to accurately estimate PM_{10} and $PM_{2.5}$ emissions from these sources. O'Connor and Genest (2003a, 2003b) have recently developed a "dilution tunnel sampler" to measure PM_{10} and $PM_{2.5}$ emissions from both wet and dry pulp and paper mill combustion sources.

4.12.2 *SO_2 Emissions*

Sulfur dioxide is formed in lime kilns when fuel oil or petroleum coke is burned as primary fuel. SO_2 will also be formed if NCGs or SOGs containing sulfur are burned in the kiln. Lime muds also contain a small amount of sulfur, which when oxidized, would form SO_2. Median sulfur content of CNCGs and SOGs have been reported as 1.1 and 4.2 lb/ADTP, respectively (NCASI 2002c). Median sulfur contents of 7 lime muds have been reported at 0.2% (NCASI 1999), which translates to about 1.83 lb S/ADTP. Thus, fossil fuels such as fuel oil, kraft mill NCG/SOGs, and soluble sulfides in lime mud can contribute a significant amount of sulfur to the inputs of a lime kiln. However, the regenerated quicklime in the kiln acts as an excellent in situ scrubbing agent, and venturi scrubbers following the kiln can further augment this SO_2 removal process since the scrubbing solution becomes alkaline from the captured lime dust. Consequently, even though the potential for SO_2 formation in a kiln that burns sulfur-containing fuels with or without NCGs/SOGs is high, most lime kilns emit very low levels of SO_2 (~50 ppm). Some kilns do, however, occasionally emit higher levels of SO_2 (50 to 200 ppm). Not much is known about why this happens. Under certain low oxygen conditions, elevated SO_2 levels have been reportedly observed in lime kiln exit gases ahead of the scrubber (Burgess 2001). Another theory proposed is that the SO_2 generated in the kiln is captured exclusively by the sodium salts (Na_2CO_3 and Na_2SO_4) resulting from volatilization of the lime mud Na content and not by the calcium salts (Kiiskila 1990). Thus, when the ratio of total sulfur input to the kiln to the sodium content in lime mud led to the kiln increases beyond 1, either by increasing the sulfur input from fuels, NCGs, etc. or from decreasing lime mud Na levels from better mud washing, the efficiency of SO_2 capture also begins to fall.

Emission test data with corresponding fuel input information for over 30 kilns are summarized in Table A13e of Appendix A. These data show that SO_2 concentrations do not appear to be related to either the fuel type (oil, gas) or the presence or absence of LVHC NCG or SOG burning in the kiln. A preliminary sulfur input-output balance was also carried out on 25 kilns with wet scrubbers and 7 kilns with electrostatic precipitators (ESPs). These kilns had sulfur inputs from fuel oil, NCGs and SOGs, or just lime mud. The results showed over 95% of the SO_2 generated from the oil, NCG/SOGs, or lime mud was captured within the kiln. For these calculations, SO_2 and TRS were considered to be the only S-containing emissions, and an average TRS emission of 10 ppm in the lime kiln stacks was assumed. Average SO_2 emissions from 7 kilns equipped with ESPs were somewhat higher than the average emissions for 25 kilns equipped with wet scrubbers (see Table 4.13).

4.12.3 *NO_x Emissions*

NO_x emissions from lime kilns result mainly from fossil fuel burning (natural gas and fuel oil). A recent NCASI study involving NO_x testing at 15 lime kilns verified that "thermal" NO_x was the sole mechanism operative in gas-fired kilns, while the "fuel" NO_x mechanism was mostly operative in oil-fired kilns (NCASI 2003a). Gas-fired kiln NO_x emissions appeared to be strongly dependent on the dry-end lime temperature. Oxygen availability in the combustion zone was determined to be the key factor in oil-fired kilns. NO_x emissions for gas-fired kilns also exhibited high short-term variability, unlike for oil-fired kilns. Analysis of long-term daily average data from two lime kilns showed no difference in NO_x emissions between days with and without LVHC NCG burning. An earlier NCASI study (NCASI 2002b) had shown that when stripper off-gases (SOGs) containing ammonia were burned in lime kilns, a small fraction of the ammonia, from -1 to 23%, converts to NO_x.

4.12.4 *CO and VOC Emissions*

CO and some VOCs (e.g., formaldehyde) are mainly products of incomplete fuel combustion, and their emission levels are highly variable among kilns. Some volatile organic compounds enter the kiln with the liquid component of lime mud and are released as the mud is heated. Volatile organic compounds present in scrubber make-up water can be stripped by the flue gas exiting the kiln. Methanol has been found to be the dominant organic compound present in lime kiln exhaust gases (NCASI 1994a).

Table 4.13 provides estimates of emissions for VOC, SO_2, NO_x, CO, total PM (TPM), condensible particulate emissions (CPM), PM_{10}, and $PM_{2.5}$ from kraft lime kilns. The data on PM_{10} and $PM_{2.5}$ emissions generated using a dilution tunnel sampler (O'Connor and Genest 2003a, 2003b) for seven kilns equipped with wet scrubbers are also shown summarized in this table. SO_2, PM_{10}, and $PM_{2.5}$ emissions are provided separately for kilns with ESPs and kilns with wet scrubbers. NO_x emissions are provided separately for kilns firing oil and kilns firing natural gas. Detailed data including descriptions for each kiln are provided in Appendix A, Tables A13a, A13b, A13c, A13d, A13e, and A13f.

Table 4.13 VOC[a], SO_2, NO_x, CO, TPM, CPM, PM_{10}, and $PM_{2.5}$ Emissions from Lime Kilns

	No.[b]	Range	Median	Mean
			lb/ton CaO	
VOC[a]	18	ND – 0.298	0.023	0.046
SO_2[d]	7	0.02 – 2.98	0.33	0.80
SO_2[e]	25	0.00 – 3.07	0.064	0.41
NO_x[f]	15	0.30 – 5.90	0.70	1.69
NO_x[g]	8	0.30 – 2.70	1.15	1.18
CO	14	0.002 – 1.23	0.055	0.181
TPM[c,d]	7	0.024 – 0.525	0.089	0.175
TPM[c,e]	31	0.35 – 5.34	1.16	1.59
CPM[h]	4	0.175 – 0.305	0.188	0.214
PM_{10}[d]	6	as % of TPM[c,d]	69.6%	64.2%
PM_{10}[e,i]	6	as % of TPM[c,e]	102.4%	100.8%
$PM_{2.5}$[4]	6	as % of TPM[3,4]	18.6%	23.6%
$PM_{2.5}$[5,9]	7	as % of TPM[3,5]	92.9%	88.1%

[a] measured as C using EPA Method 25A; [b] number of kilns tested; [c] total (filterable) particulate matter; [d] kilns with ESPs; [e] kilns with wet scrubbers; [f] gas-fired kilns; [g] oil-fired kilns; [h] condensible particulate matter for kilns with ESPs; for estimating CPM from kilns with wet scrubbers, use 16% of TPM for such kilns (see footnote 9); [i] primary + condensible PM_{10} and $PM_{2.5}$; if only primary PM_{10} and $PM_{2.5}$ is desired, subtract 16% for average CPM contribution

4.13 Causticizing Area Sources

Slakers are generally vented through a stack to discharge the large amounts of steam generated. The steam contains a considerable amount of particulate matter, which is largely calcium and sodium carbonates and sulfates. Scrubbers are generally employed to capture this particulate matter. Numerous other pieces of equipment in the causticizing area are vented to the atmosphere. These sources are associated with the processing of green liquor (clarifiers, storage and surge tanks, dregs filters); white liquor (causticizer tanks, clarifiers, pressure filters, storage tanks); and lime mud (mix tanks, dilution tanks, storage tanks, pressure filters, precoat filters, filter vacuum pump exhausts). These sources typically have small gas flow rates and very low concentrations of gaseous organic compounds, with methanol being the primary one (NCASI 1994a). The amounts of organic compounds in the vent gases will be a function of the process liquid concentrations, temperature of the process, and vent gas flow rates. Total VOC emissions from all of these sources are on the order of 0.3 lb/ton CaO or less. Table 4.14 provides estimates of emissions for VOCs from several causticizing area sources and TPM emissions from four slakers. Detailed data including descriptions for each source are provided in Appendix A, Tables A14a and A14b.

Lime Kilns

The lime kiln data were obtained from NCASI Technical Bulletins Nos. 852 (NCASI 2002), 884 (NCASI 2004), and 898 (NCASI 2005) and are summarized in Table 3. Detailed data are presented in Table A4 of Appendix A. The emissions data are separated by control device type. The majority of lime kilns in this data set used wet control devices for particulate control. Two of the lime kilns used an ESP for particulate control, followed by a wet scrubber for SO_2 control. The remainder used an ESP for particulate control. Once again, as for SDTs, wet stacks are not amenable to be tested for PM_{10}, $PM_{2.5}$ and CPM by the traditional EPA Methods 201A (PM_{10}), modified 201A ($PM_{2.5}$), CTM 039 (PM_{10}, $PM_{2.5}$) and CTM 040 (PM_{10}, $PM_{2.5}$), which are designed for stacks following dry PM control devices. O'Connor and Geneste (2003) used a modified dilution tunnel method to quantify total PM_{10} and $PM_{2.5}$ emissions from six Canadian kraft lime kilns with wet scrubbers.

The filterable PM data for lime kilns using wet control devices are from 31 sources listed in NCASI Technical Bulletin No. 884 (NCASI 2004), Table A13c. The data for PM_{10} and $PM_{2.5}$ emissions for lime kilns using wet control devices are presented as a percentage fraction of the total PM corresponding to the six Canadian lime kilns tested by O'Connor and Geneste (2003) (see NCASI Technical Bulletin No. 884, Table A13d) for which both PM_{10} and $PM_{2.5}$ data were obtained . In the O'Connor and Geneste (2003) study, lime kiln total PM_{10} and $PM_{2.5}$ emissions were measured using a dilution tunnel followed by size-specific cyclones and quartz filters. To determine the filterable and condensible fractions of total PM_{10} and $PM_{2.5}$ emissions, the filters were heated at 120°C to determine weight loss. The portion remaining after heating was assumed to be the filterable fraction and the portion lost was assumed to equal the condensible fraction of the samples.

The CPM data for lime kilns with wet scrubbers in Table 3 were obtained from NCASI tests (4 units) reported in NCASI Technical Bulletin No. 898 (NCASI 2005) and from the Canadian study (seven kilns) summarized in Technical Bulletin No. 884 (NCASI 2004). The organic CPM, inorganic CPM and sulfate CPM data are from two to three sources listed in Technical Bulletin No. 898 (NCASI 2005).

All of the PM and CPM data for lime kilns using an ESP followed by a wet control device are from two sources listed in NCASI Technical Bulletin No. 898 (NCASI 2005). Unfortunately, no PM_{10} and $PM_{2.5}$ data are available for such sources. However, if one assumes that the wet scrubber played no role in removing or contributing to PM emissions from such sources, which is not an unreasonable assumption, one could use the results for lime kilns using ESPs to estimate the PM_{10} and $PM_{2.5}$ fractions of PM. Total CPM emissions data for two kilns, and organic CPM, inorganic CPM and sulfate CPM emissions for one kiln are obtained from Technical Bulletin No. 898 (NCASI 2005).

The filterable PM data for lime kilns using an ESP alone are from the 7 sources listed in NCASI Technical Bulletin No. 884 (NCASI 2004), Table A13c. The PM_{10} and $PM_{2.5}$ data are from the 6 sources listed in Technical Bulletin No. 884 (NCASI 2004), Table A13d. These data are also presented as a percentage fraction of the filterable PM corresponding to the six lime kilns tested. As discussed earlier for the recovery furnaces, the in-stack total PM data for kilns with ESPs were adjusted by 0.004 gr/dscf to obtain estimated total Method 5 PM values. These adjusted PM values were used to estimate $PM_{2.5}$ and PM_{10} values at percents of EPA Method 5 values. Table 3 also shows the estimated percentages if the total PM value was not adjusted. The CPM data are from 4 sources that are summarized in NCASI Technical Bulletin No. 852 (NCASI 2002). The organic CPM, organic CPM (water soluble) and sulfate CPM data are from two to three sources listed in Technical Bulletins No. 852 (NCASI 2002).

Table 3. Lime Kiln Data Summary

Lime Kilns with Wet Particulate Control Devices

Parameter	Measurement Method	No. of Sources	Range (lb/ton CaO)	Mean (lb/ton CaO)	Mean Percent of PM or CPM
PM	EPA Method 5	31	0.35 – 5.34	1.59	
PM_{10}	Dilution Tunnel	6			84.7[1]
$PM_{2.5}$	Dilution Tunnel	6			76.8[1]
CPM – Total	EPA Method 202	11	0.020 - 0.453	0.155	
CPM - Organic		3			8.3[2]
CPM Inorganic - Sulfate (as H_2SO_4)		2			58.2[2]
CPM Inorganic – non-sulfate[4]		3			33.5[2]

Lime Kilns with a Dry ESP for Particulate Control Followed by a Wet Scrubber

Parameter	Measurement Method	No. of Sources	Range (lb/ton CaO)	Mean (lb/ton CaO)	Mean Percent of PM or CPM
PM	EPA Method 5	2	0.043 - 0.053	0.048	
PM_{10}					No Data[3]
$PM_{2.5}$					No Data[3]
CPM – Total	EPA Method 202	2	0.070 - 0.161	0.116	
CPM - Organic		1			54.9[2]
CPM Inorganic - Sulfate (as H_2SO_4)		1			45.1[2]
CPM Inorganic – non-sulfate[4]		1			0.0[2]

Lime Kilns with a Dry ESP for Particulate Control

Parameter	Measurement Method	No. of Sources	Range (lb/ton CaO)	Mean (lb/ton CaO)	Mean Percent of PM
PM	EPA Method 5	7	0.024 - 0.525	0.175	
PM_{10}	EPA CTM-040	6			30.2[1]
$PM_{2.5}$	EPA CTM-040	6			11.0[1]
CPM – Total	EPA Method 202	4	0.057 - 0.198	0.152	
CPM - Organic		3			31.5[2]
CPM Inorganic - Sulfate (as H_2SO_4)		2			20.8[2]
CPM Inorganic – non-sulfate[4]		3			47.7[2]

[1]filterable PM_{10} and $PM_{2.5}$ values expressed as percent of filterable PM values – note that for lime kilns with ESPs, PM_{10} and $PM_{2.5}$ were calculated as percent of total PM by adding 0.004 gr/dscf to total PM values; average PM_{10} and $PM_{2.5}$ values without such adjustment would be higher (64.2% and 23.6%, respectively); [2]organic and inorganic (sulfate and non-sulfate) CPM values expressed as percent of total CPM values; [3]may be estimated using the fractions for lime kilns with dry ESPs in Table 3; [4]see footnote 3 in Table 1

5.4.4 *Lime Kilns*

CO and some VOCs (e.g., formaldehyde) are mainly products of incomplete fuel combustion, and their emission levels are highly variable among kilns. Some volatile organic compounds enter the kiln with the liquid component of lime mud and are released as the mud is heated. Volatile organic compounds present in scrubber make-up water can be stripped by the flue gas exiting the kiln. Methanol has been found to be the dominant organic compound present in lime kiln exhaust gases (NCASI 1994d).

Trace metals are present in the lime mud that results from clarifying white liquor. The washed lime mud is calcined in the lime kiln by the firing of a fossil fuel such as fuel oil or natural gas. Trace quantities of metals present in the lime mud as well as the fossil fuel will be volatilized and will not be completely captured by the lime kiln particulate collection device (scrubber or ESP). The relationship between trace metals emissions and emissions of total particulate from lime kilns is not well understood.

Table 16A provides summary emissions of several organic 'air toxics,' terpenes, TRS and THCs from 34 kraft lime kilns. Information concerning the specifics of each kiln, such as type of particulate control device, lime production rate, gas flow rates, etc. are presented in Table A-14 of Appendix A. Detailed emissions data for each 'air toxic' at each kiln stack are also given in Table A-14. Twenty-eight of these lime kilns had wet scrubbers (venturi scrubbers) and used fresh water or clean condensate for scrubber make-up solution. Five lime kilns had ESPs for particulate emission control. One lime kiln had a wet scrubber and an ESP. Two lime kilns had mist eliminators instead of venturi scrubbers. Most of these lime kilns used natural gas for fuel; however, a few kilns were tested using oil for fuel, as shown in Table 16A. NCGs are burned in most of these lime kilns; however, several kilns did not burn NCGs. In NCASI Technical Bulletin No. 650 (NCASI 1993), it was shown from limited data that VOC emissions from lime kilns were essentially the same when burning or not burning NCGs. Maintaining conditions for complete combustion is perhaps the key factor in controlling lime kiln emissions of VOCs.

A total of 54 different organic 'air toxics' were identified in the emissions from these lime kilns. Besides individual organic 'air toxics,' Table 16A also provides emissions of H_2S, HCl, H_2SO_4, terpenes, TRS and THCs. Methanol is the most dominant VOC emission from lime kilns, with a mean emission rate of about 0.031 lb/ton CaO (range - ND to 0.98). H_2S was the largest non-organic emission, with a mean of 0.067 lb/ton CaO. Once again, several organic 'air toxics' were measured at only one source, and these values should be used with caution.

Tables 16B and 16C provide summaries of recently compiled (NCASI 2002b) emission data for 4 kilns with ESPs and 13 kilns with venturi scrubbers for the 11 HAP trace metals (Sb, As, Be, Cd, Cr, Co, Pb, Mn, Hg, Ni and Se), respectively. Information concerning the specifics of each kiln, such as type of particulate control device, lime production rate, gas flow rates, simultaneous PM emission rate, etc. is presented in Table A-14A of Appendix A. Detailed emissions data for each trace metal HAP at each kiln stack are also given in Table A-14A. Also provided in Table 16C for kilns with wet scrubbers are summary emissions data for other non-HAP trace metals including Ba, Cu, Ag, Th, Zn, non-metal P and hexavalent Cr (Cr^{+6}). Similar data for kilns with ESPs were unavailable.

An analysis of the emission data for various organic compounds corresponding to three lime kilns with and without concurrent burning of LVHC NCGs showed no discernible impact on the emissions due to the NCG burning (NCASI 1993).

Table 16A. Summary of 'Air Toxic' Emissions from Kraft Lime Kilns

Volatile Organic Compound	No. of Sources	Detects	Emissions, lb/ton CaO				
				NDs > 50%		NDs ≤ 50%	
			Range	NOR-PLOT[b] or SDln[c] avg	Median[1] using ND = 0	Median[2] using ND = ½ DL	Mean[2] using ND = ½ DL
1,1,1-Trichloroethane	21	0			*8.0E-05*	*8.0E-05*	*8.0E-05*[d]
1,1,2-Trichloroethane	17	0			*3.8E-04*	*3.8E-04*	*3.8E-04*[d]
1,2,4-Trichlorobenzene	8	2	ND to 4.7E-02	1.3E-04[c]			
1,2-Dichloroethane	8	0			*3.7E-04*	*3.7E-04*	*3.7E-04*[d]
1,2-Dichloroethylene	8	0			*1.9E-04*	*1.9E-04*	*1.9E-04*[d]
Acetaldehyde	12	8	ND to 1.2E-02		9.6E-04	5.5E-03	5.1E-03[a]
Acetone	22	10	ND to 0.039	8.1E-04[b]			
Acetophenone	15	0			*5.5E-03*	*5.5E-03*	*5.5E-0*[d]
Acrolein	15	3	ND to 2.1E-03	2.1E-05[b]			
Benzaldehyde	2	0			*5.5E-03*	*5.5E-03*	*5.5E-03*[d]
Benzene	25	7	ND to 6.6E-03	3.3E-04[b]			
Bromodichloromethane	3	1	ND to 5.4E-05	8.7E-06[c]			
Bromomethane	1	1	1 to 9 ppb		1.6E-04	1.6E-04	1.6E-04
Carbon Disulfide	5	1	ND to 3.5E-03	2.9E-04[c]			
Carbon Tetrachloride	18	0			*1.5E-03*	*1.5E-03*	*1.5E-0*[d]
Carbonyl Sulfide	5	0			*3.9E-03*	*3.9E-03*	*3.9E-03*[d]
3-Carene	6	0			*1.1E-02*	*1.1E-02*	*1.1E-0*[d]
Chlorobenzene	17	1	ND to 4.6E-04	1.1E-05[c]			
Chloroform	24	1	ND to 2.1E-04	3.6E-06[c]			
Chloromethane	1	1	27 to 187 ppb		1.7E-03	1.7E-03	1.7E-03
m-Cresol	4	0			*9.5E-03*	*9.5E-03*	*9.5E-03*[d]
o-Cresol	13	0			*4.7E-03*	*4.7E-03*	*4.7E-0*[d]
Cumene	15	0			*5.5E-03*	*5.5E-03*	*5.5E-0*[d]
p-Cymene	6	1	ND to 9.6E-05	3.3E-06[c]			
Ethanol	17	2	ND to 5.7E-02	1.1E-02[c]			
Ethyl Benzene	14	0			*3.0E-03*	*3.0E-03*	*3.0E-0*[d]
Formaldehyde	11	6	ND to 4.2E-02		1.5E-03	5.5E-03	8.5E-03[a]
Hexachlorocyclopentadiene	4	0			*1.2E-02*	*1.2E-02*	*1.2E-0*[d]
Hexachloroethane	7	0			*1.0E-02*	*1.0E-02*	*1.0E-0*[d]
n-Hexane	18	2	ND to 4.8E-04	2.1E-05[c]			
Hydrogen Chloride	4	1	ND to 1.9E-03	2.1E-04[c]			
Iodomethane	1	0	ND [1.6E-04]				
Isooctane	1	0	ND [1.6E-04]				
Isopropanol	12	3	ND to 1.5E-02	8.7E-04[b]			
Methanol	28	17	ND to 0.98		8.0E-03	1.2E-02	3.1E-02[a]
Methyl Ethyl Ketone	25	8	ND to 0.174	4.3E-05[b]			
Methyl Isobutyl Ketone	23	3	ND to 1.3E-03	2.0E-04[b]			
Methylene Chloride	22	1	ND to 2.3E-04	4.2E-06[c]			
Naphthalene	2	2	ND to 4.8E-03		1.3E-02	1.3E-02	1.3E-02
Phenol	13	1	ND to 0.016	2.7E-04[c]			

Table 16A (Cont'd). Summary of 'Air Toxic' Emissions from Kraft Lime Kilns

Volatile Organic Compound	No. of Sources	Detects	Emissions, lb/ton CaO: Range	NDs > 50%: NOR-PLOT[b] or SDln[c] avg	NDs ≤ 50%: Median[1] using ND = 0	NDs ≤ 50%: Median[2] using ND = ½ DL	NDs ≤ 50%: Mean[2] using ND = ½ DL
Styrene	8	2	ND to 1.6E-03	5.7E-05[c]			
Sulfuric Acid[3]	2	2	6.8E-07 to 0.021		6.8E-07[3]	6.8E-07[3]	6.8E-07[3]
alpha-Pinene	11	2	ND to 0.16	2.2E-05[c]			
beta-Pinene	11	2	ND to 6.0E-02	9.8E-06[c]			
Terpenes	14	8	ND to 1.0E-01		7.1E-03	2.9E-02	3.2E-02[a]
alpha-Terpineol	5	0			*3.0E-03*	*3.0E-03*	*3.0E-03*[d]
Tetrachloroethylene	8	1	ND to 5.3E-03	2.6E-04[c]			
Toluene	24	7	ND to 2.4E-02	1.5E-05[b]			
Trichloroethylene	17	0			*3.7E-04*	*3.7E-04*	*3.7E-04*[d]
Trichlorofluoromethane	1	1	ND to 8.3E-06		4.2E-05	4.2E-05	4.2E-05
Vinyl Acetate	1	0			*8.0E-05*	*8.0E-05*	*8.0E-05*[d]
m,p-Xylene	25	4	ND to 5.7E-03	6.8E-06[b]			
o-Xylene	25	5	ND to 0.132	2.1E-04[b]			
Total Hydrocarbons[7]	16	15	ND to 0.20		3.2E-02	3.2E-02	5.2E-02
TRS and Reduced Sulfur Compounds							
Dimethyl Disulfide	23	3	ND to 0.068	4.5E-06[b, 5]			
Dimethyl Sulfide	23	3	ND to 0.11	1.6E-06[b, 5]			
Hydrogen Sulfide	9	7	ND to 0.22			5.0E-02[4]	6.7E-02[a, 5]
Methyl Mercaptan	23	4	ND to 0.035	2.4E-05[b, 5]			
Total TRS[6]	23	22	0.0074 to 0.21			4.7E-02	6.3E-02

[1]median based upon assuming all non-detects (NDs) = 0 as in NCASI Technical Bulletin No. 701 (1995)
[2]median/mean based upon assuming ND = ½ detection limit (DL)
[3]6.8E-07 for a gas-fired kiln; 0.021 for a kiln likely burning No. 6 oil and/or NCGs with simultaneous SO_2 measurements of 28 to 96 ppm
[4]from NCASI Technical Bull. No. 849 – all NDs were assumed at ½ the DL when estimating averages
[5]using NOR-PLOT average for DMS, DMDS and CH_3SH and Trimmed Mean for H_2S and data from NCASI Technical Bulletin No. 849
[6]total TRS emissions in lb S/ton CaO
[7]total hydrocarbon emissions in lb C/ton CaO
[a]Trimmed Mean for data sets with 15 to 50% NDs; [b]NOR-PLOT Average; [c]SDln Average; The "NOR-PLOT Average" and "SDln Average" are statistically derived sample averages applicable to all data sets with greater than 50% NDs; [d]when more than 1 source is tested and all observations are ND, averages shown correspond to ½ of the lowest detection limit.
Non-detects are shown in italics at ½ the detection

Table 16B. Summary of Trace Metal Emissions from Kraft Lime Kilns with ESPs

Trace Metal	Reference No.	No. of Sources	Detects	Min	Max	Emissions, lb/ton CaO: NDs > 50%: NOR-PLOT[a] or SDln[b] avg	NDs ≤ 50%: Median[1] using ND = 0	NDs ≤ 50%: Median[2] using ND = ½ DL	NDs ≤ 50%: Mean[2] using ND = ½ DL
PM	1	4	4	0.02	0.39		0.12	0.12	0.04
Sb	1	4	2	*1.4E-06*	3.8E-06		1.5E-06	2.6E-06	2.6E-06
As	1	4	1	*1.4E-06*	3.1E-06	5.4E-07[b]			
Be	1	4	1	*7.4E-07*	1.5E-05	2.6E-06[b]			
Cd	1	4	4	1.9E-06	2.9E-05		1.1E-05	1.1E-05	1.3E-05
Cr	1	4	4	3.8E-06	9.1E-05		3.3E-05	3.3E-05	4.0E-05
Co	1	4	3	*7.4E-07*	3.0E-05		7.7E-06	7.7E-06	1.1E-05
Pb	1	4	4	3.0E-06	5.1E-05		1.5E-05	1.5E-05	2.1E-05
Mn	1	4	4	8.0E-06	1.0E-04		3.3E-05	3.3E-05	4.4E-05
Hg	1	4	2	6.0E-08	9.9E-06		3.0E-08	2.2E-06	3.6E-06
Ni	1	4	4	7.4E-06	2.4E-04		4.1E-05	4.1E-05	8.3E-05
Se	1	3	2	2.8E-07	3.1E-06		2.8E-07	2.1E-06	1.8E-06
P	1	4	3	*5.0E-05*	1.5E-03		5.0E-04	5.0E-04	6.4E-04
Ba								No data	No data
Cu								No data	No data
Zn								No data	No data
Ag								No data	No data
Th								No data	No data
Cr^{+6}								No data	No data

[1]median based upon assuming all non-detects (NDs) = 0 as in NCASI Technical Bulletin No. 701 (1995a)
[2]median/mean based upon assuming ND = ½ detection limit (DL)
[a]NOR-PLOT Average; [b]SDln Average; The "NOR-PLOT Average" and "SDln Average" are statistically derived sample averages applicable to all data sets with >50% NDs.
PM – simultaneous total particulate matter emissions
References: 1 (NCASI 2002b)
Non-detects are shown in italics at ½ the detection limit

Table 16C. Summary of Trace Metal Emissions from Kraft Lime Kilns with Wet Scrubbers

Trace Metal	Reference No.	No. of Sources	Detects	Emissions, lb/ton CaO					
						NDs > 50%	NDs ≤ 50%		
				Min	Max	NOR-PLOT[b] or SDln[c] avg	Median[1] using ND = 0	Median[2] using ND = ½ DL	Mean[2] using ND = ½ DL
PM	1	12	12	0.00	5.34		0.78	0.78	1.52
Sb	1	10	6	*1.5E-06*	1.0E-05		2.1E-06	3.1E-06	3.7E-06[a]
As	1	12	5	1.1E-06	1.2E-04	6.1E-07[b]			
Be	1	13	4	*1.6E-07*	1.0E-05	2.4E-08[b]			
Cd	1	10	9	1.8E-06	3.3E-05		5.8E-06	1.3E-05	1.4E-05
Cr	1	13	12	5.8E-06	9.6E-04		2.0E-04	2.0E-04	2.7E-04
Co	1	11	8	1.9E-06	3.6E-05		2.3E-06	1.0E-05	1.0E-05[a]
Pb	1	12	9	9.0E-06	1.7E-02		2.1E-04	1.6E-04	3.2E-03[a]
Mn	1	13	13	1.0E-04	8.3E-03		3.0E-04	3.0E-04	1.7E-03
Hg	1	6	1	*7.7E-09*	5.2E-06	6.2E-07[c]			
Ni	1	13	12	1.5E-05	1.3E-03		9.5E-05	9.5E-05	3.1E-04
Se	1	12	4	*4.7E-07*	1.2E-04	2.6E-06[b]			
P	1	7	7	2.5E-05	2.9E-03		1.7E-03	1.7E-03	1.5E-03
Ba	1	3	3	3.4E-04	1.2E-03		5.3E-04	5.3E-04	6.8E-04
Cu	1	2	2	2.2E-05	1.8E-04		1.0E-04	1.0E-04	1.0E-04
Zn	1	2	2	6.7E-05	1.0E-04		8.4E-05	8.4E-05	8.4E-05
Ag	1	1	0				*7.8E-07*	*7.8E-07*	*7.8E-07*
Th	2	2	1	*2.3E-05*	7.8E-06		7.8E-06	7.8E-06	2.8E-06
Cr^{+6}	1,2	3	1	*9.1E-06*	7.6E-05	1.8E-05[c]			

[1]median based upon assuming all non-detects (NDs) = 0 as in NCASI Technical Bulletin No. 701 (1995)
[2]median/mean based upon assuming ND = ½ detection limit (DL)
[a]Trimmed Mean for data sets with 15 to 50% NDs; [b]NOR-PLOT Average; [c]SDln Average; The "NOR-PLOT Average" and "SDln Average" are statistically derived sample averages applicable to all data sets with >50% NDs.
PM – simultaneous total particulate matter emissions
References: 1 (NCASI 2002b); 2 (NCASI 1995a)
Non-detects are shown in italics at ½ the detection limit

APPENDIX C

PETCOKE BURNER DATA

COEN

Clean combustion. Powerful results.

November 18, 2006
Smurfit Stones Container Corp.
Po Box 59560
Panama City, FL32412

Quotation #06-50-0016A

Attention: Mr. Kevin Knight

Subject: Coke/Gas/#6 Oil Fired Burners for Lime Recovery Kilns Your RFQ 100

Dear Mr. Knight

This refers to your email inquiry of 11/806 in connection with a proposal for retrofitting the existing lime recovery kiln to coke/gas/oil-fired burner. In response Coen Company Inc., is pleased to give below prices for the equipment.

The attached quote is for the coke/gas/oil-fired burner, optional burner management system (BMS) and CFD modeling. The burner is of proven design utilizing dual (two) air zones for better flame shaping capabilities. One of the largest American pulp & paper manufacturing company has used this design burner for more than five years with very good results saving millions of dollars in operational costs. A number of other paper mills have used our burners in the '80s when the gas prices were very high. Some are still firing coke & alternate fuels. Smurfit Stone, Hodge, LA has very successfully used our burners to fire coke in two kilns and saving several million dollars in fuel costs.

Coen burners are capable of firing coke as **high as 90%.** The burner does not require refractory lining to be changed to higher quality like other make burners may require. Coen gas burners produce almost as radiant a flame as that from oil firing. This means that the gas consumption is 2.5 to 4% less than that with competition's burner for the same production.

We hope you will find the offer in line with your requirements and look forward to working with you for the successful completion of this prestigious project.

Very truly yours,
COEN COMPANY, INCORPORATED

B.K. Wadhwani

B.K. Wadhwani
Product Manager
Process Equipment

OFFER

Coke Firing

Coen has supplied coke/gas fired burners to many pulp mills. One of the mills using coke is the IP Prattville mill where Coen replaced a competition's burner. Coen burner has been in operation for more than five years. With the new burner, IP has been able to fire 40% more coke (up to 90% of the firing rate) than that with the previous burner.

Since most other makes burners have not demonstrated the capability to fire 90% coke with Coen burner you will be able to save approximately 2,200,000/year (based on 75% coke substitution by other make burners).

Refractory Lining

With the old burner IP used to replace refractory every few months. With our burner there is hardly any refractory damage. Thus IP have, possibly, been able to **save more than $8,000,000** in four years in the fuel cost & in the cost of repairs. **That means the return on capital was less than a month**.

For your application the burner is designed not to produce a very high temperature flame. Hence one may not have to upgrade the refractory lining. The competitions' burners will possibly require higher-grade refractory as they produce high intensity flame. We are informed by some of the users of these competition's (from abroad) burners that they had to replace refractory frequently.

Coke Conveying Airflow

We have quoted the burner on the basis of an indirect-fired system. In this system the coke is supplied with approximately 7 to 8% of stoichiometric air (1,130scfm) at 20" wc at the burner.

Coke Particle Classification

For firing 80% plus coke Coen would prefer to have the following particle distribution:

% Passing	Mesh Size
96	120
80	200
68	270
22	325

Primary Air Fan

Primary air required will be approximately 7,520 SCFM at 24"wc at the burner.

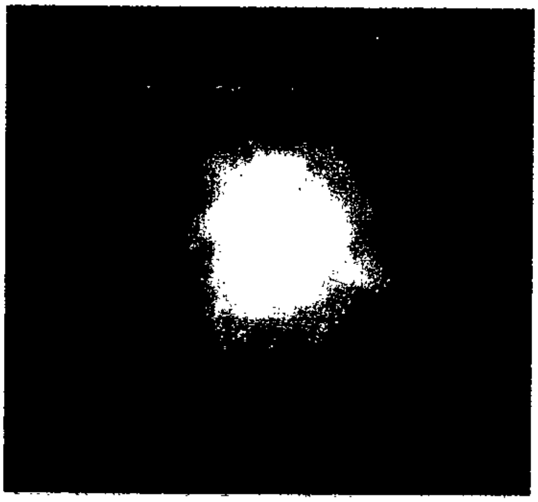
Dual Air Zone Burner

The modern, efficient burner designs have more than one channel through which the fuel and primary air is injected. Coen has offered Dual Air & Gas Zone Burner. In a dual air zone burner primary air is supplied through a central pipe at the firing end of which a spinner is located. The spinner is specifically designed for that particular kiln. Coke is supplied through a concentric pipe (outer zone) to the above pipe. In other words coke flows in the outer channel (or annulus zone). The spinner in the central zone imparts a spin to the air & creates a recirculation zone. The hot gases trap the coke resulting in a stable controlled flame. By changing the amount of the spin air one can manipulate the flame shape to suit the specific kiln. This is especially true for turndown capability.

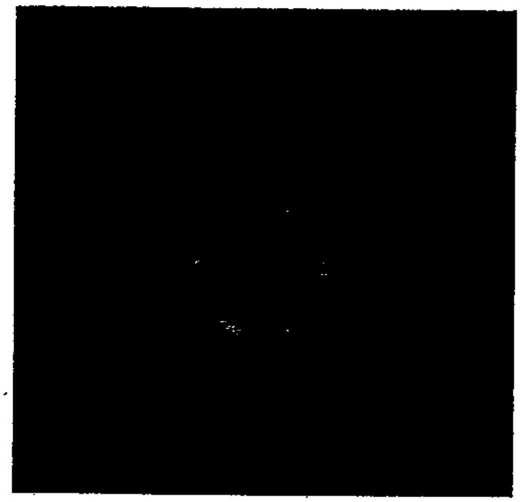
Dual Zone Gas Gun

The gas entering the gun is divided in two zones. The outer (annulus) zone has a ¾" thick tapered stainless steel nozzle with several waves of orifices. Therefore, the gas jets exit the nozzle at an angle. These gas jets mix with the core primary air exiting from the spinner & develop a stable flame at the nozzle.

The other part of the gas comes through the central (core) zone. At the end of this zone the gas exits around an inverted tapered nozzle. The gas exits in a very thin inverted expanding hollow cone. This gas is surrounded by the flame of the annulus gas & does not mix with the core/spinner air. Hence the gas gets heated up & splits in to Carbon (C) & Hydrogen (H_2) elements. These two elements then burn with the secondary air from the cooler. Carbon burning produces a very radiant flame, which almost matches with the radiant flame from burning of oil. As one knows a radiant flame has higher heat transfer coefficient hence Coen dual zone gas gun produces a high radiant flame, which is 4-5% more efficient.



Oil Flame (Radiant)



Gas Flame (Non-Radiant)

Since our competition's design does not split the gas (CH4) in to C & H_2 elements, with Coen gas burner there is approximately 4% savings in the fuel consumption as compared to a competition's burner. In your case this will **translate in to a savings of well over $550,000/yr**.

In addition, there is recirculation produced by the spinner bringing in flue gases (internal flue gas generator) and since the heat is transferred efficiently the flame cools down thereby **reducing the thermal NOx** produced from our burner as compared with any other make burner.

Oil Gun

Coen oil gun with the specially designed multi- air stream spinner produces a stable flame throughout the firing range. Hence you will be able to fire 100% of #6 oil without the need of frequently cleaning the nozzle or change over to costly gas firing. Hence you will achieve further savings in the fuel cost.

Gas/Electric Igniter

Coen gas/electric igniter is a two-stage igniter producing a long, stable flame. The igniter hood is made of stainless steel for kiln application. We locate the igniter 12" - 13" behind the exit end of the air tube, away from the radiation of the kiln, thus giving it a long working life.

The igniter has been used to heat up refractory by designing the igniter to higher capacity. This avoids using the main burner, which needs to started & stopped for a controlled rise of temperature. This main burner produces thermal shocks resulting in reduced refractory life.

Computational Fluid Dynamics Computer Modeling

Coen recommends performing Computational Fluid Dynamics (CFD) modeling of the kiln-burner to see the effects of changes to the spin air and predict the amount of air, its pressure etc. to optimize the flame shape. This is imprtant for kilns firing CNCGs as well. The CFD modeling also predicts the expected flame geometry indicating any hot spots, which may tend to damage the refractory. Thus with this tool we design the system to avoid hot spots etc. Attached is a case study of a coke fired kiln where this tool was used to solve the existing problem of refractory damage was solved in a lime recovery kiln.

Piping Module

We have assumed that the existing valve trains are in good working condition and per the latest NFPA requirements.

Burner Management System

We have shown price for the burner management system with Allen Bradley PLC, 10" PanelView color monitor (model 2711P-K10C681) & IRIS scanners.

OPERATING PARAMETERS

Heat Input, Million Btu/Hr, HHV:	180.
Main Fuels:	Pulverized coke having LHV of 14,600 Btu/#, 90% passing through 200 Mesh, 1% Moisture.
Coke Conveying Air:	1,130 scfm at 20" WC at the burner.
Alternate Fuel:	Natural Gas HHV of 1,010 Btu/cft.
	#6 fuel oil rated at 18,500 Btu/#, oil pressure 150 Psig, 100 SSU Viscosity, at the burner.
	Steam to be supplied at 150 Psig (slightly super heated) at the burner.
Fuel Pressure:	Gas -20 psig at the burner at max firing.
Primary Air:	7,520 SCFM at 24"wc at the burner.
LVHC NCG, Acfm	990 at 120° F at 12" wc.
Cooling Air (for NCG)	1,500 scfm at 8" wc.
Electrical Power:	120 V/ 1PH/60 Cycles.
Site Elevation:	FASL.
Ambient Temperature:	15°F to 105°F.
Area of Classification:	Non-Hazardous NEMA4 (Covered)
Number of Burners:	One (1).

1) **KILN BURNER ASSEMBLY:**

Coen offers a fabricated burner suitable for **Pulverized Coke/Gas/#6 Oil** specially designed for a lime recovery kiln. The burner will consist of the following main components:

a) One (1) Primary Air Tube Assembly designed to achieve the required velocity range with primary air for coke firing. That portion of the primary air tube extending through the kiln hood (approximately 6'-0") will be made from 309 spuncast stainless steel, 1/2" thick. That portion of the air tube extending over operator's floor area will be constructed of carbon steel. Manually lockable primary air dampers will be provided along with pressure gauges, 10 ft. long flexible air hose with stainless steel securing clamps.

b) The coke burner will be fabricated from carbon steel with a deflector plate duly hardened to resist abrasion.

3) Special Gas Gun for firing burner at 50% firing rate with up to 90% coke substitution, add **$9,300.**

Note: Any valves etc. to be supplied by others.

All Equipment prices shown above are FOB Woodland, CA/Point of manufacture..

Emissions:

The users of Coen coke fired kiln burners have informed us that their emissions are within the requirements of NCASI. They have not shared the actual numbers with us. However with 80% coke and 20% gas and operating temperature of 1,800° F to 2,000°F we estimate NOx emission of between 105 to 125 ppm at 10% excess air. However when using #6 oil (FBN 0.3%) the estimated NOx will be approximately 165 to 185 ppm at 10% oxygen, based on HHV, dry basis.

Exclusions:

The following are not included in Coen's proposal

a) Supply of any fuels, Conveying air, primary air etc.
b) Piping trains.
c) Checkout and startup services at jobsite.
d) Freight to job site.
e) Any other equipment not specifically described above.

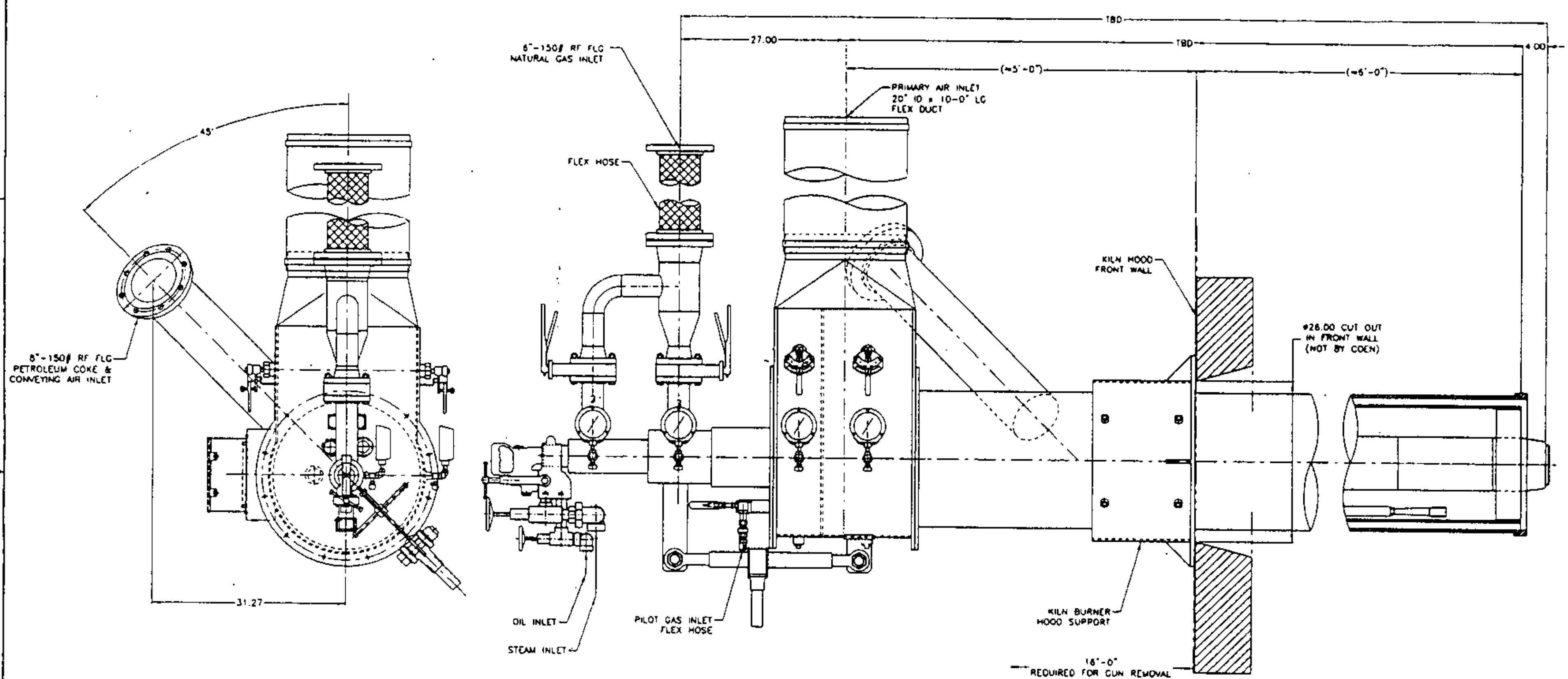
Terms of Payment:

Coen's suggested terms of payment are the following (subject to credit approval, 30 days net):

10% upon receipt of a purchase order.
15% upon the drawing submittal.
35% upon release to fabricate.
40% upon shipment of equipment.

Prices quoted are firm for thirty (30) days. The quoted prices will be held through the normal delivery period or up to ten (10) months from receipt of order. For orders delayed beyond the normal delivery period, or ten (10) months from receipt of order, through no fault of Coen Company, escalation will be applied. Escalation will be figured as the ratio of the Producer (Wholesale) Price Index of the Bureau of Labor Statistics at the end of the day, ten (10) months from receipt of order, to the same index on the day the order is shipped

The attached forms "Coen Company Terms and Conditions of Sale T&C 6-15-2001" and " Domestic Factory Service Conditions and Rates 7-01-2006" are part of this quotation.



APPROX. WT: 2500 LBS.

NOTES:

1. SUPPORT FLEX HOSE AND GAS PIPING IN FIELD, BY OTHERS
2. INSERTION DEPTH TO BE ADJUSTED AT START-UP AS REQUIRED BY COEN SERVICE.

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Clean combustion. Powerful results.
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PROPOSED ARRANGEMENT
180 M BTU/H KILN BURNER
PET COKE/GAS/#6 OIL
SSCC PANAMA CITY, FL

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TABLE D-1

EMISSION RATE CALCULATIONS FOR LIME KILN

TABLE D-1
EMISSION RATE CALCULATIONS FOR
SMURFIT-STONE CONTAINER ENTERPRISES - PANAMA CITY MILL

EU ID	Source	Emission Factor	Emission Factor Reference	Activity Factor	Emission Rate Short-Term (lb/hr)	Emission Rate Annual (TPY)
NO_x						
001	No. 1 Recovery Boiler	1.09 lb/ton	Ref. 1, Table 4.11	123,700 lb/hr	67.4	295.3
019	No. 2 Recovery Boiler	1.09 lb/ton	Ref. 1, Table 4.11	123,700 lb/hr	67.4	295.3
021	No. 1 Smelt Dissolving Tank	0.020 lb/ton	Ref. 1, Table 4.15	123,700 lb/hr	1.2	5.4
020	No. 2 Smelt Dissolving Tank	0.020 lb/ton	Ref. 1, Table 4.15	123,700 lb/hr	1.2	5.4
004	Lime Kiln	107.8 lb/hr	185 ppmvd @ 10% O_2	81,400 dscfm	107.8	472.2
015	No. 3 Combination Boiler	176.7 lb/hr	Feb. 2006 application[a]	--	176.7	773.9
016	No. 4 Combination Boiler	334.0 lb/hr	Feb. 2006 stack test	--	334.0	1,462.9
SO_2						
001	No. 1 Recovery Boiler	2.29 lb/ton	Ref. 1, Table 4.11	123,700 lb/hr	141.6	620.4
019	No. 2 Recovery Boiler	2.29 lb/ton	Ref. 1, Table 4.11	123,700 lb/hr	141.6	620.4
021	No. 1 Smelt Dissolving Tank	0.005 lb/ton	Ref. 1, Table 4.15	123,700 lb/hr	0.31	1.4
020	No. 2 Smelt Dissolving Tank	0.005 lb/ton	Ref. 1, Table 4.15	123,700 lb/hr	0.31	1.4
004	Lime Kiln	0.183 lb/MMBtu	Footnote "b"	180 MMBtu/hr	32.9	144.3
015	No. 3 Combination Boiler: 3-hr	1,592.4 lb/hr	Feb. 2006 application[c]	--	1,592.4	--
	24-hr	887.0 lb/hr	Current Permit Limit	--	887.0	3,885.1
016	No. 4 Combination Boiler: 3-hr	1,183.0 lb/hr	Permit Limit	--	1,183.0	--
	24-hr	690.0 lb/hr	Proposed BART Limit	--	690.0	3,022.2

CCA = Clean Condensate Alternative

Footnotes:

[a] Based on 474 MMBtu/hr wood @ 0.25 lb/MMBtu; 83 MMBtu/hr fuel oil @ 0.25 lb/MMBtu; and 37.4 lb/hr due to stripper offgas burning.

[b] Based on: 1 lb petcoke/15,300 Btu x 7% S/100 x 2 lb SO_2/lb S x 1E06 Btu/MMBtu x (1-0.80) x (1-0.90).

[c] Limit based on modeling analysis conducted in 2004 for CCA application.

References:

1. From *Compilation of Criteria Air Pollutant Emissions Data For Sources At Pulp And Paper Mills Including Boilers*. National Council For Air and Stream Improvement (NCASI), August 2004. Median value used.