PSD-FL-329 4/25/02 JT

# AIR PERMIT APPLICATION AND PSD ANALYSIS FOR *PALM BEACH POWER CORP.* PAHOKEE, FLORIDA

**Prepared For:**

**Palm Beach Power Corp.**
**US Highway 98 & Hatton Highway**
**Pahokee, Florida 33476**

**Prepared By:**

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

**April 2002**
**0137678**

**DISTRIBUTION:**
**4 Copies – FDEP**
**5 Copies – Palm Beach Power Corp.**
**2 Copies – Golder Associates Inc.**

**Golder Associates Inc.**

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

April 18, 2002 013-7678

Department Of Environmental Protection
New Source Review Section
2600 Blair Stone Road, MS 5505
Tallahassee, FL 32399-2400

Attention: Alvaro A. Linero, P.E., Administrator

RE: PALM BEACH POWER CORP., COGENERATION FACILITY
PSD PERMITTING PROJECT

Dear Mr. Linero:

Enclosed please find four (4) copies of the Prevention of Significant Deterioration (PSD) application and a check in the amount of $7,500 for the Palm Beach Power Corp. cogeneration facility. This represents the re-permitting of the Osceola Power cogeneration facility.

Please feel free to call me at (352) 336-5600 ext. 545 if you have any questions.

Sincerely,

GOLDER ASSOCIATES INC.

David A. Buff

David A. Buff, P.E., Q.E.P.
Principal Engineer

DAB/FWH

Enclosures

cc: G. Cepero, New Hope Power
D. Dee, Landers & Parsons
J. Meriwether, New Hope Power
C. Rionda, PBPC
B. Tarr, Florida Crystals

H:\Osceola\2002 PSD RePermit\FinalCoverLetter.doc

# AIR PERMIT APPLICATION AND PSD ANALYSIS FOR *PALM BEACH POWER CORP.* PAHOKEE, FLORIDA

**Prepared For:**

**Palm Beach Power Corp.**
**US Highway 98 & Hatton Highway**
**Pahokee, Florida 33476**

**Prepared By:**

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

**April 2002**
**0137678**

**DISTRIBUTION:**
**4 Copies – FDEP**
**5 Copies – Palm Beach Power Corp.**
**2 Copies – Golder Associates Inc.**

# PART A

# AIR PERMIT APPLICATION

# Department of Environmental Protection

## Division of Air Resources Management

## APPLICATION FOR AIR PERMIT - TITLE V SOURCE

See Instructions for Form No. 62-210.900(1)

### I. APPLICATION INFORMATION

**Identification of Facility**

| | |
|---|---|
| 1. Facility Owner/Company Name: **Palm Beach Power Corp.** | |
| 2. Site Name: **Osceola Cogeneration Plant** | |
| 3. Facility Identification Number: | [ X ] Unknown |
| 4. Facility Location: Street Address or Other Locator: **US 98 & Hatton Highway** City: **Pahokee** County: **Palm Beach** Zip Code: **33476** | |
| 5. Relocatable Facility? [ ] Yes [ X ] No | 6. Existing Permitted Facility? [ ] Yes [ X ] No |

**Application Contact**

| |
|---|
| 1. Name and Title of Application Contact: **James Meriwether, Environmental and Safety Manager** |
| 2. Application Contact Mailing Address: Organization/Firm: **Palm Beach Power Corp.** Street Address: **P.O. Box 606** City: **Pahokee** State: **FL** Zip Code: **33476** |
| 3. Application Contact Telephone Numbers: Telephone: **( 561 ) 993-1003** Fax: **( 561 ) 996-6596** |

**Application Processing Information (DEP Use)**

| | |
|---|---|
| 1. Date of Receipt of Application: | 4-22-02 |
| 2. Permit Number: | 0990331-009-AC |
| 3. PSD Number (if applicable): | PSD-FL-329 |
| 4. Siting Number (if applicable): | |

## Purpose of Application

### Air Operation Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[ ] Initial Title V air operation permit for an existing facility which is classified as a Title V source.

[ ] Initial Title V air operation permit for a facility which, upon start up of one or more newly constructed or modified emissions units addressed in this application, would become classified as a Title V source.

Current construction permit number:_____

[ ] Title V air operation permit revision to address one or more newly constructed or modified emissions units addressed in this application.

Current construction permit number: _____

Operation permit number to be revised: _____

[ ] Title V air operation permit revision or administrative correction to address one or more proposed new or modified emissions units and to be processed concurrently with the air construction permit application. (Also check Air Construction Permit Application below.)

Operation permit number to be revised/corrected:_____

[ ] Title V air operation permit revision for reasons other than construction or modification of an emissions unit. Give reason for the revision; e.g., to comply with a new applicable requirement or to request approval of an "Early Reductions" proposal.

Operation permit number to be revised:_____

Reason for revision:_____

### Air Construction Permit Application

This Application for Air Permit is submitted to obtain: (Check one)

[ X ] Air construction permit to construct or modify one or more emissions units.

[ ] Air construction permit to make federally enforceable an assumed restriction on the potential emissions of one or more existing, permitted emissions units.

[ ] Air construction permit for one or more existing, but unpermitted, emissions units.

## Owner/Authorized Representative or Responsible Official

1. Name and Title of Owner/Authorized Representative or Responsible Official:
   **Carlos Rionda, General Manager**
2. Owner/Authorized Representative or Responsible Official Mailing Address:
   Organization/Firm: **Palm Beach Power Corp.**
   Street Address: **U.S. 98 and Hatton Highway**
   City: **Pahokee** State: **FL** Zip Code: **33476**
3. Owner/Authorized Representative or Responsible Official Telephone Numbers:
   Telephone: **( 561 ) 924-7156** Fax: **( 561 ) 924-3246**
4. Owner/Authorized Representative or Responsible Official Statement:

   *I, the undersigned, am the owner or authorized representative*(check here [ X ], if so) or the responsible official (check here [ ], if so) of the Title V source addressed in this application, whichever is applicable. 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. 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 any permitted emissions unit.*

   Signature: _____ Date: 4/16/02

* Attach letter of authorization if not currently on file.

## 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 NW 23rd Street, Suite 500**
   City: **Gainesville** State: **FL** Zip Code: **32653-1500**
3. Professional Engineer Telephone Numbers:
   Telephone: **(352) 336-5600** Fax: **(352) 336-6603**

4. 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.*

*If the purpose of this application is to obtain a Title V source 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 schedule is submitted with this application.*

*If the purpose of this application is to obtain an air construction permit for one or more proposed new or modified emissions units (check here [ X ], 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.*

*If the purpose of this application is to obtain an initial air operation permit or operation permit revision 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.*

Daniel A. Buff — Signature

4/18/2002 — Date

(seal)

*Attach any exception to certification statement.

## Scope of Application

| Emissions Unit ID | Description of Emissions Unit | Permit Type | Processing Fee |
|---|---|---|---|
| | Cogen Boiler No. 1 | AC1A | |
| | Cogen Boiler No. 2 | AC1A | |
| | Materials Handling System | AC1A | |
| | Package Boiler | AC1A | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## Application Processing Fee

Check one: [ X ] Attached - Amount: $: 7,500 [ ] Not Applicable

## Construction/Modification Information

| |
|---|
| 1. Description of Proposed Project or Alterations:<br><br>**Re-permitting of the Osceola Cogeneration Plant as a new facility and installation of a new package boiler. See PSD Report.** |
| 2. Projected or Actual Date of Commencement of Construction: **01 Jun 2002** |
| 3. Projected Date of Completion of Construction: **31 Dec 2003** |

## Application Comment

| |
|---|
| |

## II. FACILITY INFORMATION

## A. GENERAL FACILITY INFORMATION

**Facility Location and Type**

| | | | |
|---|---|---|---|
| 1. Facility UTM Coordinates:<br>Zone: **17** East (km): **544.2** North (km): **2968.0** | | | |
| 2. Facility Latitude/Longitude:<br>Latitude (DD/MM/SS): / / Longitude (DD/MM/SS): / / | | | |
| 3. Governmental Facility Code:<br>**0** | 4. Facility Status Code:<br>**C** | 5. Facility Major Group SIC Code:<br>**49** | 6. Facility SIC(s):<br>**4911** |
| 7. Facility Comment (limit to 500 characters):<br>**The Palm Beach Power Corp. cogeneration facility consists of two cogeneration boilers, one package boiler, and associated facilities and operations necessary to generate steam for the Osceola Farms sugar mill, as well as generate electricity for sale to the grid.** | | | |

**Facility Contact**

| |
|---|
| 1. Name and Title of Facility Contact:<br>**James Meriwether, Environmental and Safety Manager** |
| 2. Facility Contact Mailing Address:<br>Organization/Firm: **Palm Beach Power Corp.**<br>Street Address: **P.O. Box 606**<br>City: **Pahokee** State: **FL** Zip Code: **33476** |
| 3. Facility Contact Telephone Numbers:<br>Telephone: **(561) 993-1003** Fax: **(561) 996-6596** |

## Facility Regulatory Classifications

**Check all that apply:**

| | |
|---|---|
| 1. [ ] Small Business Stationary Source? | [ ] Unknown |
| 2. [ X ] Major Source of Pollutants Other than Hazardous Air Pollutants (HAPs)? | |
| 3. [ ] Synthetic Minor Source of Pollutants Other than HAPs? | |
| 4. [ ] Major Source of Hazardous Air Pollutants (HAPs)? | |
| 5. [ ] Synthetic Minor Source of HAPs? | |
| 6. [ X ] One or More Emissions Units Subject to NSPS? | |
| 7. [ ] One or More Emission Units Subject to NESHAP? | |
| 8. [ ] Title V Source by EPA Designation? | |
| 9. Facility Regulatory Classifications Comment (limit to 200 characters):<br><br>**See Attachment PB-FI-A9** | |

## List of Applicable Regulations

| | |
|---|---|
| **Only the rules, regulations, and ordinances specifically identified herein apply to this facility.** | |
| **See attached Title V Core List Effective 03/01/2002.** | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

## B. FACILITY POLLUTANTS

**List of Pollutants Emitted**

| 1. Pollutant Emitted | 2. Pollutant Classif. | 3. Requested Emissions Cap lb/hour | tons/year | 4. Basis for Emissions Cap | 5. Pollutant Comment |
|---|---|---|---|---|---|
| PM | A | | | | Particulate Matter-Total |
| $PM_{10}$ | A | | | | Particulate Matter-$PM_{10}$ |
| $SO_2$ | A | | | | Sulfur Dioxide |
| $NO_X$ | A | | | | Nitrogen Oxides |
| CO | A | | | | Carbon Monoxides |
| VOC | A | | | | Volatile Organic Compounds |
| PB | B | | | | Lead |
| H114 | B | | | | Mercury Compounds |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

## C. FACILITY SUPPLEMENTAL INFORMATION

**Supplemental Requirements**

| |
|---|
| 1. Area Map Showing Facility Location:<br>[ X ] Attached, Document ID: PB-FI-C1 [ ] Not Applicable [ ] Waiver Requested |
| 2. Facility Plot Plan:<br>[ X ] Attached, Document ID: PB-FI-C2 [ ] Not Applicable [ ] Waiver Requested |
| 3. Process Flow Diagram(s):<br>[ X ] Attached, Document ID: PB-FI-C3 [ ] Not Applicable [ ] Waiver Requested |
| 4. Precautions to Prevent Emissions of Unconfined Particulate Matter:<br>[ X ] Attached, Document ID: PSD Report [ ] Not Applicable [ ] Waiver Requested |
| 5. Fugitive Emissions Identification:<br>[ X ] Attached, Document ID: PSD Report [ ] Not Applicable [ ] Waiver Requested |
| 6. Supplemental Information for Construction Permit Application:<br>[ X ] Attached, Document ID: PSD Report [ ] Not Applicable |
| 7. Supplemental Requirements Comment: |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

| |
|---|
| 8. List of Proposed Insignificant Activities:<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable |
| 9. List of Equipment/Activities Regulated under Title VI:<br>[ ] Attached, Document ID:_____<br>[ ] Equipment/Activities On site but Not Required to be Individually Listed<br>[ X ] Not Applicable |
| 10. Alternative Methods of Operation:<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 11. Alternative Modes of Operation (Emissions Trading):<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 12. Identification of Additional Applicable Requirements:<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 13. Risk Management Plan Verification:<br>[ ] Plan previously submitted to Chemical Emergency Preparedness and Prevention Office (CEPPO). Verification of submittal attached (Document ID:_____) or previously submitted to DEP (Date and DEP Office:_____)<br>[ ] Plan to be submitted to CEPPO (Date required:_____)<br>[ X ] Not Applicable |
| 14. Compliance Report and Plan:<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 15. Compliance Certification (Hard-copy Required):<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |

# ATTACHMENT PB-FI-A

# TITLE V CORE LIST

# 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~~

# ATTACHMENT PB-FI-A9

# FACILITY REGULATORY CLASSIFICATION COMMENT

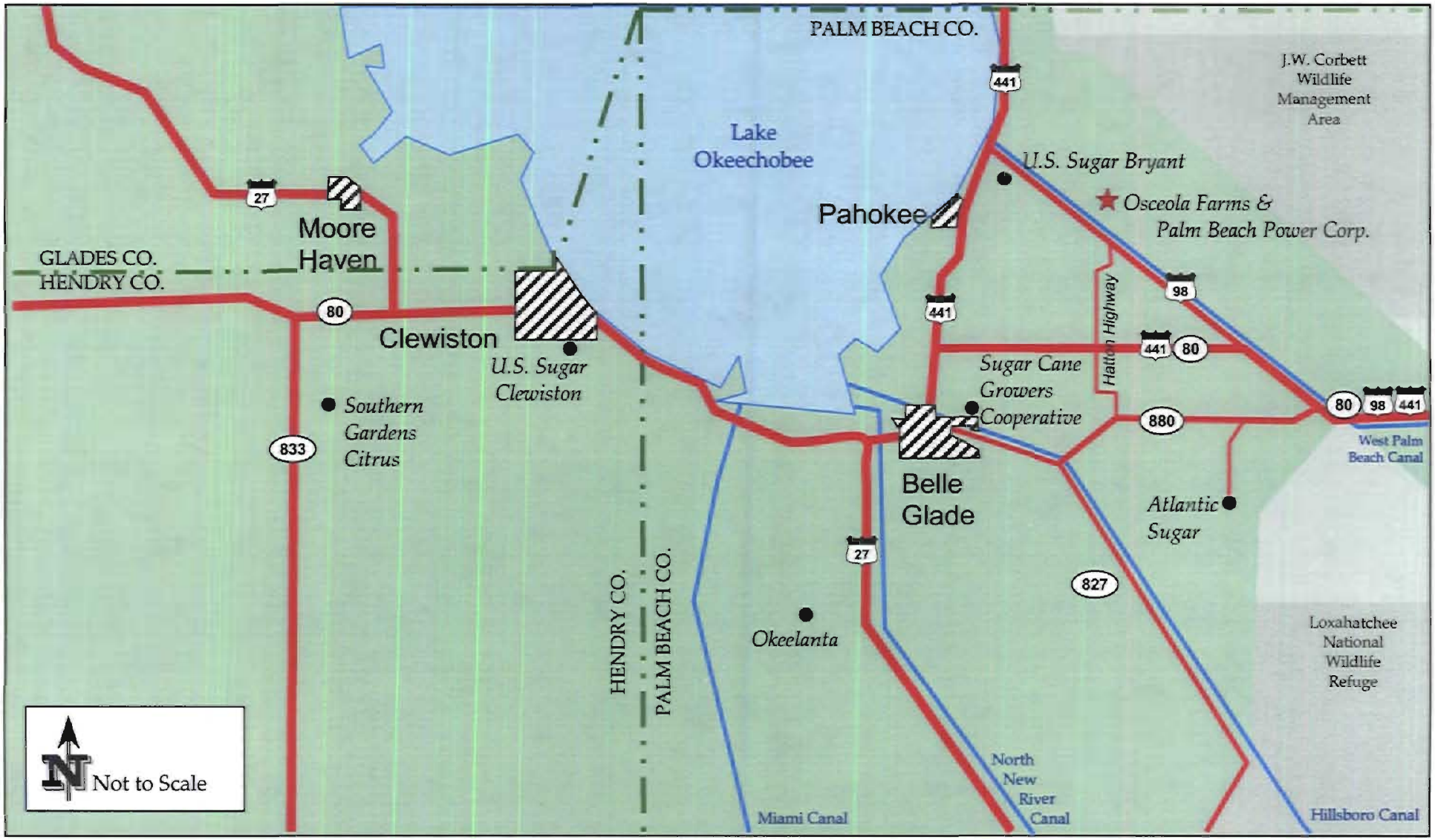
## ATTACHMENT PB-FI-A9

## FACILITY REGULATORY CLASSIFICATION COMMENT

At this time, it is unclear whether Palm Beach Power Corp. will be classified as major for HAPs. Palm Beach Power Corp. and New Hope Power (a similar facility) have no emissions test data indicating significant HAP emissions from its boilers. Emissions test data from the Pulp and Paper Industry indicate that there are HAPs emissions from wood-fired boilers. However, these emissions data may not be representative of Palm Beach Power Corp.'s HAP emissions. In addition, recent sugar industry test data indicates that there are HAPs emissions from sugar industry bagasse fired boilers. However, Palm Beach Power Corp. believes the HAPs emissions from burning bagasse in its boilers will be much lower than the emissions from the older boilers in the sugar industry. Further, Osceola Farms will cease operating its sugar mill boilers when steam can be supplied by Palm Beach Power Corp. on a reliable, full-time basis.

# ATTACHMENT PB-FI-C1

# AREA MAP SHOWING FACILITY LOCATION




**Attachment PB-FI-C1**
Location of Palm Beach Power Corp.

Source: Golder Associates Inc., 2002.

Golder Associates

# ATTACHMENT PB-FI-C2

# FACILITY PLOT PLAN

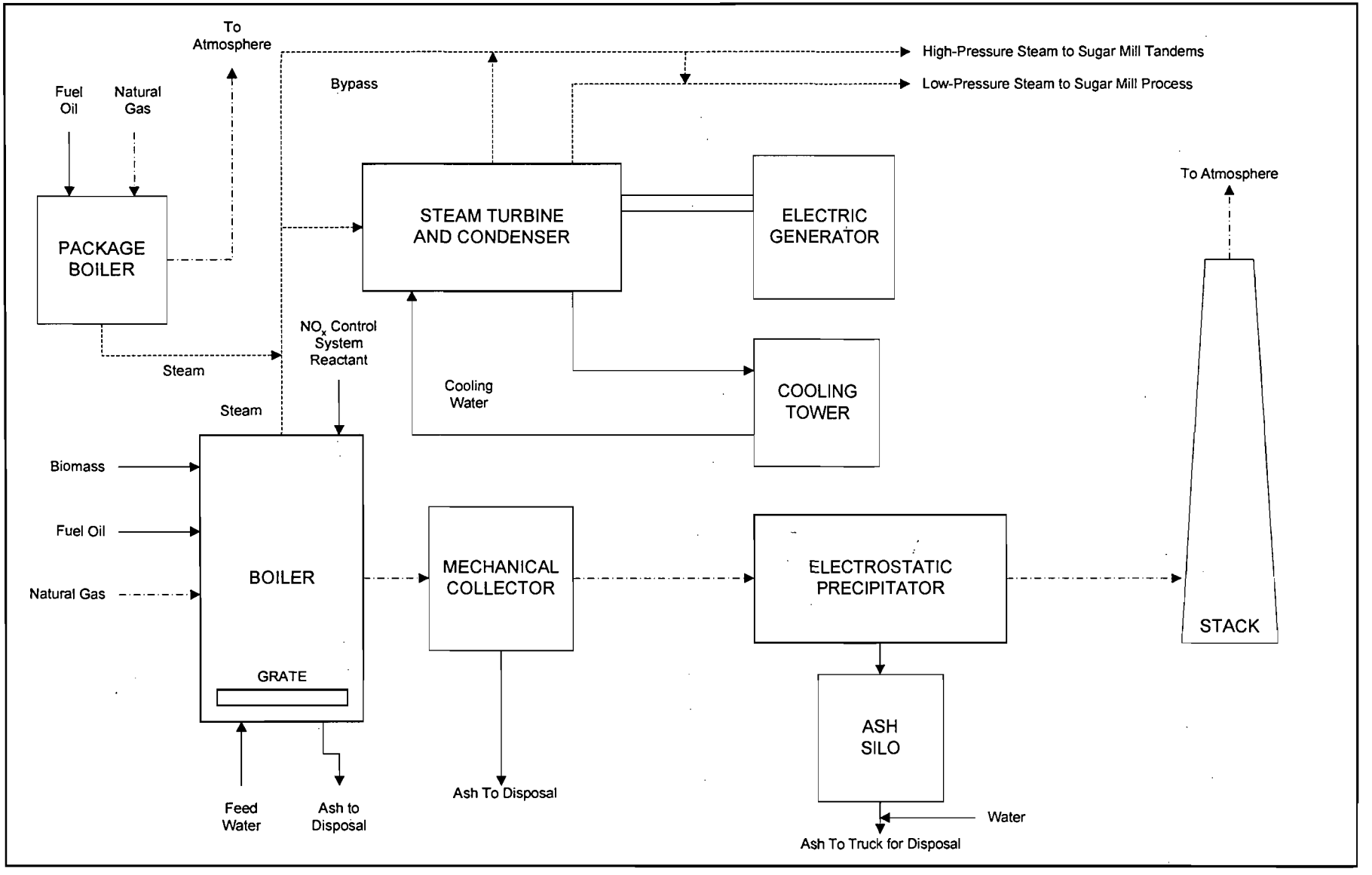
Attachment PB-FI-C2
Facility Plot Plan - Palm Beach Power Corporation

Source: Photogrammetric Technologies, Inc., 2002; Golder, 2002.

Golder Associates

# ATTACHMENT PB-FI-C3

# PROCESS FLOW DIAGRAM




Attachment PB-FI-C3
Simplified Flow Diagram
Palm Beach Power Corp.

**Process Flow Legend**
Solid/Liquid →
Steam ---→
Gas -·-·-→

Filename: 0137678\4\4.4\4.4.1\PB-FI-C3.vsd\Page-2
Date: 04/01/02

Golder Associates

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

### A. GENERAL EMISSIONS UNIT INFORMATION
### (All Emissions Units)

**Emissions Unit Description and Status**

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

[ X ] 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. Regulated or Unregulated Emissions Unit? (Check one)

[ X ] 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.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
**Cogen Boiler No. 1 fired by Biomass/No. 2 oil/natural gas**

4. Emissions Unit Identification Number:
ID:
[ X ] No ID
[ ] ID Unknown

| 5. Emissions Unit Status Code: | 6. Initial Startup Date: | 7. Emissions Unit Major Group SIC Code: | 8. Acid Rain Unit? |
|---|---|---|---|
| C | | 49 | [ ] |

9. Emissions Unit Comment: (Limit to 500 Characters)

## Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   **ESP - Electrostatic Precipitator - High Efficiency**
   **Selective Non-catalytic Reduction for $NO_x$**
   **Multiple Cyclone w/o Fly Ash Reinjection**

2. Control Device or Method Code(s): **10,107,76**

## Emissions Unit Details

| | | |
|---|---|---|
| 1. Package Unit: | | |
| Manufacturer: | Model Number: | |
| 2. Generator Nameplate Rating: | MW | |
| 3. Incinerator Information: | | |
| Dwell Temperature: | | °F |
| Dwell Time: | | seconds |
| Incinerator Afterburner Temperature: | | °F |

## B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

**Emissions Unit Operating Capacity and Schedule**

| | | | |
|---|---|---|---|
| 1. Maximum Heat Input Rate: | | 760 | mmBtu/hr |
| 2. Maximum Incineration Rate: | lb/hr | | tons/day |
| 3. Maximum Process or Throughput Rate: | | | |
| 4. Maximum Production Rate: | | | |
| 5. Requested Maximum Operating Schedule: | | | |
| | 24 hours/day | 7 | days/week |
| | 52 weeks/year | 8,760 | hours/year |
| 6. Operating Capacity/Schedule Comment (limit to 200 characters): | | | |
| **Maximum heat input rates: Biomass - 760 MMBtu/hr; No. 2 Fuel Oil - 600 MMBtu/hr; Natural Gas - 600 MMBtu/hr** | | | |

## C. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

**List of Applicable Regulations**

| |
|---|
| See Attachment PB-EU1-C. |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |

## D. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | | |
|---|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram? **Boiler No. 1** | | 2. Emission Point Type Code: **1** |
| 3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | | |
| 5. Discharge Type Code: **V** | 6. Stack Height: **199** feet | 7. Exit Diameter: **8.0** feet |
| 8. Exit Temperature: **340** °F | 9. Actual Volumetric Flow Rate: **326,000** 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 Comment (limit to 200 characters): **Stack parameters based on biomass firing.** | | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
### (All Emissions Units)

**Segment Description and Rate:** Segment 1 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Electric Utility Boiler - Bagasse** | | |
| 2. Source Classification Code (SCC): **10101101** | 3. SCC Units: **Tons Burned** | |
| 4. Maximum Hourly Rate: **105.56** | 5. Maximum Annual Rate: **924,667** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: **0.05** | 8. Maximum % Ash: **1.0** | 9. Million Btu per SCC Unit: **7.20** |
| 10. Segment Comment (limit to 200 characters): **Maximum sulfur content is on a dry basis.** | | |

**Segment Description and Rate:** Segment 2 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): **Electric Utility Boiler - Wood Fired Boiler** | | |
| 2. Source Classification Code (SCC): **10100903** | 3. SCC Units: **Tons Burned** | |
| 4. Maximum Hourly Rate: **84.445** | 5. Maximum Annual Rate: **739,778** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: **0.3** | 8. Maximum % Ash: **9.0** | 9. Million Btu per SCC Unit: **9.0** |
| 10. Segment Comment (limit to 200 characters): **Maximum sulfur content is on a dry basis.** | | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

**Segment Description and Rate:** Segment 3 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Electric Utility Boiler - Distillate Oil- Grades 1 and 2 Oil** | | |
| 2. Source Classification Code (SCC): **10100501** | 3. SCC Units: **Thousand Gallons Burned** | |
| 4. Maximum Hourly Rate: **4.348** | 5. Maximum Annual Rate: **11,309** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: **0.05** | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: **138** |
| 10. Segment Comment (limit to 200 characters): | | |

**Segment Description and Rate:** Segment 4 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): **Electric Utility Boiler - Natural Gas** | | |
| 2. Source Classification Code (SCC): **10100601** | 3. SCC Units: **MMscf Burned** | |
| 4. Maximum Hourly Rate: **0.600** | 5. Maximum Annual Rate: **1,561** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: **1,000** |
| 10. Segment Comment (limit to 200 characters): | | |

## F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| PM | 76 | 010 | EL |
| $PM_{10}$ | 76 | 010 | EL |
| $SO_2$ | | | EL |
| $NO_X$ | 107 | | EL |
| CO | | | EL |
| VOC | | | EL |
| PB | 076 | 010 | EL |
| SAM | | | NS |
| FL | | | NS |
| H114 | | | EL |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **PM** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **22.8** lb/hour **99.87** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.03 lb/MMBtu** Reference: **40 CFR 60 Subpart Da** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **0.03 lb/MMBtu x 760 MMBtu/hr =22.8 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.03 lb/MMBtu** | 4. Equivalent Allowable Emissions: **22.8** lb/hour **99.87** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Annual Stack testing using EPA Method 5.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Basis for Allowable Emissions code: NSPS. Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: PM | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: OTHER | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: 0.03 lb/MMBtu | 4. Equivalent Allowable Emissions: 18.0 lb/hour 23.42 tons/year |
| 5. Method of Compliance (limit to 60 characters): Fuel Analysis. | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Basis for Allowable Emissions Code: NSPS. Based on No. 2 fuel oil firing. | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$PM_{10}$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **22.8** lb/hour **99.87** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.03 lb/MMBtu** Reference: **40 CFR 60 Subpart Da** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **0.03 lb/MMBtu x 760 MMBtu/hr = 22.8 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.03 lb/MMBtu** | 4. Equivalent Allowable Emissions: **22.8** lb/hour **99.87** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Annual stack testing using EPA Method 5.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$PM_{10}$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.03 lb/MMBtu** | 4. Equivalent Allowable Emissions: **18.0** lb/hour **23.4** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Fuel Analysis** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Basis for Allowable Emissions code: NSPS. Based on No. 2 fuel oil firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$SO_2$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **228.0** lb/hour **199.74** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.30 lb/MMBtu** Reference: **CEM Data** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **3-Hour average = 0.30 lb/MMBtu x 760 MMBtu/hr = 228.0** **24-Hour average = 0.20 lb/MMBtu x 760 MMBtu/hr = 152.0** **Annual average = 0.06 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr ÷ 2,000 lb/ton = 199.74 TPY** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.06 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **199.74** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $SO_2$ monitor.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Requested Allowable Emissions: 0.2 lb/MMBtu 24-hr average; 0.06 lb/MMBtu annual average. Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$SO_2$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.05% S Fuel** | 4. Equivalent Allowable Emissions: **30.0** lb/hour **39.0** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Fuel analysis and limit fuel oil burning to 24.9%.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on No. 2 fuel oil firing and BACT.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **152.0** lb/hour **499.4** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.15 lb/MMBtu** Reference: **Proposed BACT Limit** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **Hourly: 0.20 lb/MMBtu x 760 MMBtu/hr = 152.0 lb/hr** **Annual: 0.15 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr ÷2,000 lb/ton = 499.4 TPY** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 3

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.15 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **499.4** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $NO_x$ monitor.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing, as a 30-day rolling average.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 3

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.15 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **117.1** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $NO_x$ monitor and limit fuel oil burning to 24.9%.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on No. 2 fuel oil firing, as a 30-day rolling average.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 3 of 3

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.15 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **117.1** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $NO_x$ monitor and limit natural gas burning to 24.9%.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on natural gas firing, as a 30-day rolling average.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **CO** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **4,940** lb/hour **1,165.2** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **6.5 lb/MMBtu** Reference: **CEM Data** | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): **1-Hour average: 6.5 lb/MMBtu x 760 MMBtu/hr = 4,940.0 lb/hr** **Annual: 0.35 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr ÷ 2,000 lb/ton = 1,165.2 TPY** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **6.5 lb/MMBtu as a 1-hr average; 0.35 lb/MMBtu as a 12-month rolling average. Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.35 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **1,165.2** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous CO monitor.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **lb/MMBtu limit based on 12-month rolling average. Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **VOC** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **45.6** lb/hour **199.7** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.06 lb/MMBtu** Reference: **Proposed Permit Limit** | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): **0.06 lb/MMBtu x 760 MMBtu/hr = 45.6 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.06 lb/MMBtu** | 4. Equivalent Allowable Emissions: **45.6** lb/hour **199.7** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Annual stack test using EPA Method 25A/18.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **Lead** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.11** lb/hour **0.50** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **1.5 x $10^{-4}$ lb/MMBtu** Reference: **Proposed BACT Limit** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **1.5 x $10^{-4}$ lb/MMBtu x 760 MMBtu/hr = 0.11 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **1.5 x $10^{-4}$ lb/MMBtu** | 4. Equivalent Allowable Emissions: **0.11** lb/hour **0.50** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Stack test using EPA Method 12, once every 5 years.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: SAM | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: 13.98 lb/hour 12.23 tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: 0.0184 lb/MMBtu<br>Reference: AP-42 | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters):<br>3-Hour average: 0.0184 lb/MMBtu x 760 MMBtu/hr = 13.98 lb/hr<br>Annual average: 0.0037 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr x 1 ton/2,000 lb = 12.23 TPY | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):<br>Based on biomass firing. | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **Fluorides** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.53** lb/hour **2.33** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **$7 \times 10^{-4}$ lb/MMBtu** Reference: **Similar Stack Test Data** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **$7 \times 10^{-4}$ lb/MMBtu x 760 MMBtu/hr = 0.53 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H114** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.0041** lb/hour **0.018** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **5.4 x $10^{-6}$ lb/MMBtu** Reference: **Proposed Permit Limit** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **5.4 x $10^{-6}$ lb/MMBtu x 760 MMBtu/hr = 0.0041** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **5.4 x $10^{-6}$ lb/MMBtu** | 4. Equivalent Allowable Emissions: **0.0041** lb/hour **0.018** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Stack test once every 5 years using EPA Method 29.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing.** | |

## H. VISIBLE EMISSIONS INFORMATION
### (Only Regulated Emissions Units Subject to a VE Limitation)

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

| | |
|---|---|
| 1. Visible Emissions Subtype: VE20 | 2. Basis for Allowable Opacity: [ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: 20 % Exceptional Conditions: 27 % Maximum Period of Excess Opacity Allowed: 6 min/hour | |
| 4. Method of Compliance: EPA Method 9 | |
| 5. Visible Emissions Comment (limit to 200 characters): 40 CFR 60, Subpart Da | |

## I. CONTINUOUS MONITOR INFORMATION
### (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 1 of 6

| | |
|---|---|
| 1. Parameter Code: VE | 2. Pollutant(s): |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: Durag Model Number: D-R281-31-AV Serial Number: 31500 | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): 40 CFR 60, Subpart Da | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 2 of 6

| | |
|---|---|
| 1. Parameter Code: **EM** | 2. Pollutant(s): **$NO_x$** |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: **Thermo Environmental Instruments** Model Number: **42D** Serial Number: **42D-53361-296** | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 60, Subpart Da** | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation ____ of ____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 3 of 6

| | |
|---|---|
| 1. Parameter Code: **EM** | 2. Pollutant(s): **$SO_2$** |
| 3. CMS Requirement: | [ ] Rule [ X ] Other |
| 4. Monitor Information: Manufacturer: **Thermo Environmental Instruments** Model Number: **43B** Serial Number: **43B-53359-296** | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 60, Subpart Da** | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 4 of 6

| | |
|---|---|
| 1. Parameter Code: EM | 2. Pollutant(s): CO |
| 3. CMS Requirement: | [ ] Rule [ X ] Other |
| 4. Monitor Information: Manufacturer: Thermo Environmental Instruments Model Number: 48 Serial Number: 48-53434-296 | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation ____ of ____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 5 of 6

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): $O_2$ |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: Yokogowa Model Number: ZA8C | Serial Number: JJ113 PA188 |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): 40 CFR 60, Subpart Da | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation ____ of ____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

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

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): $CO_2$ |
| 3. CMS Requirement: | [ ] Rule [ X ] Other |
| 4. Monitor Information: Manufacturer: California Analytical Model Number: ZRH1 | Serial Number: N5B3528T |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
**(Regulated Emissions Units Only)**

**Supplemental Requirements**

| | |
|---|---|
| 1. Process Flow Diagram<br>[ X ] Attached, Document ID: PB-FI-C3 [ ] Not Applicable [ ] Waiver Requested | |
| 2. Fuel Analysis or Specification<br>[ X ] Attached, Document ID: PB-EU1-J2 [ ] Not Applicable [ ] Waiver Requested | |
| 3. Detailed Description of Control Equipment<br>[ X ] Attached, Document ID: PB-EU1-J3 [ ] Not Applicable [ ] Waiver Requested | |
| 4. Description of Stack Sampling Facilities<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable [ ] Waiver Requested | |
| 5. Compliance Test Report<br>[ ] Attached, Document ID:_____<br>[ ] Previously submitted, Date:_____<br>[ X ] Not Applicable | |
| 6. Procedures for Startup and Shutdown<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable [ ] Waiver Requested | |
| 7. Operation and Maintenance Plan<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable [ ] Waiver Requested | |
| 8. Supplemental Information for Construction Permit Application<br>[ X ] Attached, Document ID: PSD Report [ ] Not Applicable | |
| 9. Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable | |
| 10. Supplemental Requirements Comment: | |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

| |
|---|
| 11. Alternative Methods of Operation<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 12. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 13. Identification of Additional Applicable Requirements<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable |
| 14. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 15. Acid Rain Part Application (Hard-copy Required)<br>[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID:_____<br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:_____<br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:_____<br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:_____<br>[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)<br>Attached, Document ID:_____<br>[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)<br>Attached, Document ID:_____<br>[ X ] Not Applicable |

# ATTACHMENT PB-EU1-C

# LIST OF APPLICABLE REGULATIONS

**Attachment PB-EU1-C - List of Applicable Regulations**

**Cogen Boiler No. 1 - Rule Applicability for Palm Beach Power Corp.**

| APPLIC STAT | RULE DESCRIP | RULE NUMBER | RULE TITLE | RATIONALE FOR NON-APPLICABILITY |
|---|---|---|---|---|
| APPLICABLE | 60 Subpart A | 40CFR60.1 | Subpart A -- General Provisions | |
| APPLICABLE | 60 Subpart A | 40CFR60.7 | Notification and Record Keeping | |
| APPLICABLE | 60Subpart A | 40CFR60.8 | Performance Testing | |
| APPLICABLE | 60 Subpart A | 40CFR60.11 | Compliance with standards and maintenance requirements. | |
| APPLICABLE | 60 Subpart A | 40CFR60.12 | Circumvention. | |
| APPLICABLE | 60 Subpart A | 40CFR60.13 | Monitoring requirements. | |
| APPLICABLE | 60 Subpart A | 40CFR60.19 | General notification and reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.40a | Subpart Da - NSPS for Electric Utility Units for which construction commenced after Sept. 18, 1978. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.42a | Standard for particulate matter | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(a) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(b) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(d)(2) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(g) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(h) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.44a | Standard for nitrogen oxides | |
| APPLICABLE | 60 Subpart Da | 40CFR60.44a(a) | Standard for nitrogen oxides | |
| APPLICABLE | 60 Subpart Da | 40CFR60.44a(c) | Standard for nitrogen oxides | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(a) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(b) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(c) | Compliance provisions. | |
| NON-APPLICABLE | 60 Subpart Da | 40CFR60.46a(d) | Compliance provisions. | Cogen Boiler 1 does not have a flue gas desulfurization system. |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(e) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(f) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(g) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(h) | Compliance provisions. | |
| NON-APPLICABLE | 60 Subpart Da | 40CFR60.46a(i) | Compliance provisions. | Cogen Boiler 1 has not been modified after July 7, 1997. |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(a) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(b)(2) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(b)(3) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(c)(1) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(d) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(e) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(f) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(g) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(h) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(i) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(j) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(a) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(b) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(c) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(d) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(e) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(a) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(b) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(c) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(d) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(f) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(g) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(h) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(i) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(j) | Reporting requirements | |

Cogen Boiler No. 1 - Rule Applicability for Palm Beach Power Corp.

| APPLIC STAT | RULE DESCRIP | RULE NUMBER | RULE TITLE | RATIONALE FOR NON-APPLICABILITY |
|---|---|---|---|---|
| APPLICABLE | 60 Subpart Ea | 40CFR60.50a(d) | Standards of performance for municipal waste combustors | |
| APPLICABLE | 60 Subpart Ea | 40CFR60.50b(j) | Standards of performance for municipal waste combustors | |
| APPLICABLE | 62-204 | 62-204.800(7)2. | NSPS Subpart Da adopted by reference. | |
| APPLICABLE | 62-296 < | 62-296 | STATIONARY SOURCES - EMISSION STANDARDS | |
| APPLICABLE | 62-296 < | 62-296.405(2) | Fossil Fuel Steam Generators with more than 250 million Btu per Hour Heat Input. | |
| NON-APPLICABLE | 62-296 < | 62-296.406 | Fossil Fuel Steam Generators with less than 250 Million Btu per Hour Heat Input, New and Existing Em | Cogen Boiler 1 has a heat input of >250 MMBtu/hr. |
| NON-APPLICABLE | 62-296 < | 62-296.410 | Carbonaceous Fuel Burning Equipment. | Not more stringent or different than NSPS. |
| APPLICABLE | 62-296 > | 62-296.500 | Reasonably Available Control Technology (RACT) - Volatile Organic Compounds (VOC) and Nitrogen Oxide | |
| APPLICABLE | 62-296 > | 62-296.500(2)(a) | Reasonably Available Control Technology (RACT) - Volatile Organic Compounds (VOC) and Nitrogen Oxide | |
| APPLICABLE | 62-296 > | 62-296.500(2)(c) | Reasonably Available Control Technology (RACT) - Volatile Organic Compounds (VOC) and Nitrogen Oxide | |
| APPLICABLE | 62-296 > | 62-296.570 | Reasonably Available Control Technology (RACT) - Requirements for Major VOC- and NOx-Emitting Facility | |
| APPLICABLE | 62-296 > | 62-296.570(1) | Applicability. | |
| APPLICABLE | 62-296 > | 62-296.570(1)(a) | Applicability. | |
| APPLICABLE | 62-296 > | 62-296.570(2) | Compliance Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(3) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4)(a) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4)(b)6. | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4)(c) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.620 | | |
| NON-APPLICABLE | 62-296 > | 62-296.700 | Reasonably Available Control Technology (RACT) Particulate Matter. | Palm Beach Power Corp. is located in Palm Beach County, which is not a nonattainment or maintenance area for particulate matter. |
| NON-APPLICABLE | 62-296 > | 62-296.702 | Fossil Fuel Steam Generators. | Palm Beach Power Corp. is located in Palm Beach County, which is not a nonattainment or maintenance area for particulate matter. |
| NON-APPLICABLE | 62-296 > | 62-296.703 | Carbonaceous Fuel Burners. | Palm Beach Power Corp. is located in Palm Beach County, which is not a nonattainment or maintenance area for particulate matter. |
| APPLICABLE | 62-297 | 62-297 | STATIONARY SOURCES - EMISSIONS MONITORING | |
| APPLICABLE | 62-297 | 62-297.310 | General Compliance Test Requirements. | |
| APPLICABLE | 62-297 | 62-297.401 | Compliance Test Methods. | |
| APPLICABLE | 62-297 | 62-297.401(1)(a) | EPA Method 1 - Sample and Velocity Traverses for Stationary sources - 40 CFR 60 Appendix A. | |
| APPLICABLE | 62-297 | 62-297.401(10) | EPA Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources - 40 CFR 60 Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(12) | EPA Method 12 - Determination of Inorganic Lead Emissions from Stationary Sources - 40 CFR 60 Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(18) | EPA Method 18 - Measurement of Gaseous Organic Compound Emissions by Gas Chromatography - 40 CFR 60 Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(19) | EPA Method 19 - Determination of Sulfur Dioxide Removal Efficiency and Particulate, Sulfur Dioxide | |
| APPLICABLE | 62-297 | 62-297.401(2) | EPA Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate - 40 CFR 60 Appendix A. | |

Cogen Boiler No. 1 - Rule Applicability for Palm Beach Power Corp.

| APPLIC STAT | RULE DESCRIP | RULE NUMBER | RULE TITLE | RATIONALE FOR NON-APPLICABILITY |
|---|---|---|---|---|
| APPLICABLE | 62-297 | 62-297.401(25) | EPA Method 25A - Determination of Total Gaseous Organic Concentraiton Using a Flame Ioinization Analyzer - 40 CFR 60, Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(3) | EPA Method 3A - Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources - 40 CFR 60, Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(32)(a) | EPA Method 101A - Determination of Particulate and Gaseous Mercury Emissions from Sewage Sludge Incinerators - 40 CFR 60, Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(4) | EPA Method 4 - Determination of Moisture Content in Stack Gases - 40 CFR 60 Appendix A. | |
| APPLICABLE | 62-297 | 62-297.401(5) | EPA Method 5 - Determination of Particulate Emissions from Stationary Sources - 40 CFR 60 Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(6) | EPA Method 6 - Determination of Sulfur Dioxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(6)(c) | EPA Method 6C - Determination of Sulfur Dioxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(7) | EPA Method 7 - Determination of Nitrogen Oxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(7)(e) | EPA Method 7E - Determination of Nitrogen Oxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(9) | EPA Test Method 9 | |
| APPLICABLE | 62-297 | 62-297.401(29) | EPA Test Method 29 - Determination of Metals Emissions from Stationary Sources | |

# ATTACHMENT PB-EU1-J2

# FUEL ANALYSIS OR SPECIFICATION

# ATTACHMENT PB-EU1-J2
# DESIGN FUEL SPECIFICATIONS[a] FOR THE PALM BEACH POWER CORP. COGENERATION FACILITY

| Parameter | | Biomass | | | |
|---|---|---|---|---|---|
| | | Bagasse | Wood Waste | No. 2 Fuel Oil | Natural Gas |
| Specific Gravity | | – | – | 0.865 | – |
| Heating Value | (Btu/lb) | 3,600 | 4,500 | 19,175 | – |
| Heating Value | (Btu/gal) | – | – | 138,000 | – |
| Heating Value | (Btu/scf) | | | | 1,000 |
| Ultimate Analysis (dry basis percentage): | | | | | |
| Carbon | | 48.93 | 49.58 | 87.01 | 82.96 |
| Hydrogen | | 6.14 | 5.87 | 12.47 | 5.41 |
| Nitrogen | | 0.25 | 0.40 | 0.02 | 1.58 |
| Oxygen | | 43.84 | 40.90 | 0.00 | 5.72 |
| Sulfur | | 0.03 | 0.07 | 0.05 | 0.67 |
| Ash/Inorganic | | 1.0 | 9.0 | 0.00 | 3.66 |
| Moisture | | 52-55 | 37 | – | 4.5 |

[a] Represents average fuel characteristics.

Sources: Palm Beach Power Corp., 2002.
Combustion Engineering, 1981.

# ATTACHMENT PB-EU1-J3

# DETAILED DESCRIPTION OF CONTROL EQUIPMENT

# ATTACHMENT PB-EU1-J3

## DETAILED DESCRIPTION OF CONTROL EQUIPMENT

The Palm Beach Power Corp. (PBPC) cogeneration facility will utilize several emission control techniques to reduce emissions. A selective non-catalytic reduction (SNCR) system will be used to reduce $NO_x$ emissions. SNCR is a system which injects urea into the boiler to reduce $NO_x$ emissions. Further, the cogeneration boilers will minimize CO and VOC through proper furnace design and good combustion practices, including: control of combustion air and combustion temperature; distribution of fuel on the combustion grate; and better controls over the furnace loads and transient conditions. Particulate emissions will be controlled by an ESP. Mechanical dust collectors will be installed to improve control of particulate emissions.

Electrostatic Precipitator

The ESP for the PBPC facility was manufactured by ABB Environmental Services. Design specifications for the ESP (one per boiler) are provided below:

Chambers = 1
Collecting Plate=12.30 ft L x 39.37 ft H
Fields/Chamber = 3
Specific Collection Area = 200 $ft^2$/1,000 acfm (minimum)
Gas Velocity = <4 ft/s
Pressure Drop = less than 2.8 inches $H_2O$
Operating Temperature = 350°F
Ash Handling = Trough hopper with screw conveyor
Particulate removal efficiency = >99.2%

$NO_x$ Control System

A urea injection system manufactured by Nalco-Fueltech has been installed for $NO_x$ control. The technology is a selective non-catalytic reduction process, which reduces $NO_x$ emissions through chemical reaction with urea. In the process, urea will be injected into the flue gas stream to react with nitrogen oxides to form nitrogen and water vapor.

The $NO_x$ control system includes the following major components:

- Carrier air compressors,
- Urea tank,
- Urea/air flow controls,
- Control Panel,
- Injection manifolds and injectors, and
- Valves and instrumentation.

A single urea storage tank system will supply urea to both boilers. Urea for injection into the boiler will be drawn from the tank. Three injection zones will be used to provide injection at full and part load conditions. The first zone will have four injectors, and the second and third zones will have six injectors each, for a total of sixteen injectors. Zone switching valves will direct the urea/carrier mixture to the appropriate injection zone.

Specifications for the urea injection system to meet the proposed $NO_x$ emission rate of 0.15 lb/MMBtu are provided below (on a per boiler basis):

| | |
|---|---|
| Urea injection rate | 65 gal/hr (max) |
| Ammonia slip | Biomass - 25 ppm (max) |
| | Oil and natural gas - 65 ppm (max) |

Dust Control System

The cyclone dust collectors will be supplied by Barron Industries, Model 460 Tube Base III 9K15-2023AU or equivalent. These are mechanical cyclone dust collectors, which remove larger size particulate matter prior to the ESP. There will be 460 cyclone tubes in all.

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

### A. GENERAL EMISSIONS UNIT INFORMATION
### (All Emissions Units)

**Emissions Unit Description and Status**

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

[ X ] 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. Regulated or Unregulated Emissions Unit? (Check one)

[ X ] 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.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
**Cogen Boiler No. 2 fired by Biomass/No. 2 oil/natural gas**

4. Emissions Unit Identification Number: [ X ] No ID
ID: [ ] ID Unknown

| 5. Emissions Unit Status Code: | 6. Initial Startup Date: | 7. Emissions Unit Major Group SIC Code: | 8. Acid Rain Unit? |
|---|---|---|---|
| C | | 49 | [ ] |

9. Emissions Unit Comment: (Limit to 500 Characters)

## Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   **ESP - Electrostatic Precipitator - High Efficiency**
   **Selective Non-catalytic Reduction for $NO_x$**
   **Multiple Cyclone without Fly Ash Reinjection**

2. Control Device or Method Code(s): **10, 107, 76**

## Emissions Unit Details

| | | |
|---|---|---|
| 1. Package Unit: | | |
| Manufacturer: | Model Number: | |
| 2. Generator Nameplate Rating: | MW | |
| 3. Incinerator Information: | | |
| Dwell Temperature: | | °F |
| Dwell Time: | | seconds |
| Incinerator Afterburner Temperature: | | °F |

## B. EMISSIONS UNIT CAPACITY INFORMATION
## (Regulated Emissions Units Only)

**Emissions Unit Operating Capacity and Schedule**

| | | | | |
|---|---|---|---|---|
| 1. Maximum Heat Input Rate: | | | 760 | mmBtu/hr |
| 2. Maximum Incineration Rate: | lb/hr | | | tons/day |
| 3. Maximum Process or Throughput Rate: | | | | |
| 4. Maximum Production Rate: | | | | |
| 5. Requested Maximum Operating Schedule: | | | | |
| | 24 | hours/day | 7 | days/week |
| | 52 | weeks/year | 8,760 | hours/year |
| 6. Operating Capacity/Schedule Comment (limit to 200 characters): | | | | |
| **Maximum heat input rates: Biomass - 760 MMBtu/hr; No. 2 Fuel Oil - 600 MMBtu/hr; Natural Gas - 600 MMBtu/hr** | | | | |

## C. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

**List of Applicable Regulations**

| |
|---|
| See Attachment PB-EU2-C. |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |

## D. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | | |
|---|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram? **Boiler No. 2** | | 2. Emission Point Type Code: **1** |
| 3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | | |
| 5. Discharge Type Code: **V** | 6. Stack Height: **199** feet | 7. Exit Diameter: **8.0** feet |
| 8. Exit Temperature: **340** °F | 9. Actual Volumetric Flow Rate: **326,000** 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 Comment (limit to 200 characters): **Stack parameters based on biomass firing.** | | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
### (All Emissions Units)

**Segment Description and Rate:** Segment 1 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Electric Utility Boiler - Bagasse** | | |
| 2. Source Classification Code (SCC): **10101101** | 3. SCC Units: **Tons Burned** | |
| 4. Maximum Hourly Rate: **105.56** | 5. Maximum Annual Rate: **924,667** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: **0.05** | 8. Maximum % Ash: **1.0** | 9. Million Btu per SCC Unit: **7.20** |
| 10. Segment Comment (limit to 200 characters): **Maximum sulfur content is on a dry basis.** | | |

**Segment Description and Rate:** Segment 2 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): **Electric Utility Boiler - Wood Fired Boiler** | | |
| 2. Source Classification Code (SCC): **10100903** | 3. SCC Units: **Tons Burned** | |
| 4. Maximum Hourly Rate: **84.445** | 5. Maximum Annual Rate: **739,778** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: **0.3** | 8. Maximum % Ash: **9.0** | 9. Million Btu per SCC Unit: **9.0** |
| 10. Segment Comment (limit to 200 characters): **Maximum sulfur content is on a dry basis.** | | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

**Segment Description and Rate:** Segment 3 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Electric Utility Boiler - Distillate Oil- Grades 1 and 2 Oil** | | |
| 2. Source Classification Code (SCC): **10100501** | 3. SCC Units: **Thousand Gallons Burned** | |
| 4. Maximum Hourly Rate: **4.348** | 5. Maximum Annual Rate: **11,309** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: **0.05** | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: **138** |
| 10. Segment Comment (limit to 200 characters): | | |

**Segment Description and Rate:** Segment 4 of 4

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): **Electric Utility Boiler - Natural Gas** | | |
| 2. Source Classification Code (SCC): **10100601** | 3. SCC Units: **MMscf Burned** | |
| 4. Maximum Hourly Rate: **0.600** | 5. Maximum Annual Rate: **1,561** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: **1,000** |
| 10. Segment Comment (limit to 200 characters): | | |

## F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| PM | 76 | 010 | EL |
| $PM_{10}$ | 76 | 010 | EL |
| $SO_2$ | | | EL |
| $NO_X$ | 107 | | EL |
| CO | | | EL |
| VOC | | | EL |
| PB | 076 | 010 | EL |
| SAM | | | NS |
| FL | | | NS |
| H114 | | | EL |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **PM** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **22.8** lb/hour **99.87** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.03 lb/MMBtu** Reference: **40 CFR 60 Subpart Da** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **0.03 lb/MMBtu x 760 MMBtu/hr =22.8 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.03 lb/MMBtu** | 4. Equivalent Allowable Emissions: **22.8** lb/hour **99.87** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Annual Stack testing using EPA Method 5.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Basis for Allowable Emissions code: NSPS. Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: PM | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: OTHER | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: 0.03 lb/MMBtu | 4. Equivalent Allowable Emissions: 18.0 lb/hour 23.42 tons/year |
| 5. Method of Compliance (limit to 60 characters): Fuel Analysis. | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): Basis for Allowable Emissions Code: NSPS. Based on No. 2 fuel oil firing. | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$PM_{10}$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **22.8** lb/hour **99.87** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.03 lb/MMBtu** Reference: **40 CFR 60 Subpart Da** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **0.03 lb/MMBtu x 760 MMBtu/hr = 22.8 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.03 lb/MMBtu** | 4. Equivalent Allowable Emissions: **22.8** lb/hour **99.87** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Annual stack testing using EPA Method 5.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$PM_{10}$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.03 lb/MMBtu** | 4. Equivalent Allowable Emissions: **18.0** lb/hour **23.4** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Fuel Analysis.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Basis for Allowable Emission Code: NSPS. Based on No. 2 fuel oil firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$SO_2$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **228.0** lb/hour **199.74** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.30 lb/MMBtu** Reference: **CEM Data** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **3-Hour average = 0.30 lb/MMBtu x 760 MMBtu/hr = 228.0** **24-Hour average = 0.20 lb/MMBtu x 760 MMBtu/hr = 152.0** **Annual average = 0.06 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr ÷ 2,000 lb/ton = 199.74 TPY** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.06 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **199.74** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $SO_2$ monitor.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Requested Allowable Emissions: 0.2 lb/MMBtu 24-hr average; 0.06 lb/MMBtu annual average. Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$SO_2$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.05% S Fuel** | 4. Equivalent Allowable Emissions: **30.0** lb/hour **39.0** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Fuel analysis and limit fuel oil burning to 24.9%.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on No. 2 fuel oil firing and BACT.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **152.0** lb/hour **499.4** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.15 lb/MMBtu** Reference: **Permit Limit** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **Hourly: 0.20 lb/MMBtu x 760 MMBtu/hr = 152.0** **Annual: 0.15 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr ÷2,000 lb/ton = 499.4 TPY** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 3

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **ESCPSD** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.15 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **499.4** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $NO_x$ monitor.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing, as a 30-day rolling average.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
(Regulated Emissions Units -
Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 3

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.15 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **117.1** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $NO_x$ monitor and limit fuel oil burning to 24.9%.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on No. 2 fuel oil firing, as a 30-day rolling average.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 3 of 3

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.15 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **117.1** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous $NO_x$ monitor and limit natural gas burning to 24.9%.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on natural gas firing, as a 30-day rolling average.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **CO** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **4,940** lb/hour **1,165.2** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **6.5 lb/MMBtu** Reference: **CEM Data** | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): **1-Hour average: 6.5 lb/MMBtu x 760 MMBtu/hr = 4,940.0 lb/hr** **Annual: 0.35 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr ÷ 2,000 lb/ton = 1,165.2 TPY** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **6.5 lb/MMBtu as a 1-hr average; 0.35 lb/MMBtu as a 12-month rolling average. Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.35 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **1,165.2** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Continuous CO monitor.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **lb/MMBtu limit based on 12-month rolling average. Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **VOC** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **45.6** lb/hour **199.7** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.06 lb/MMBtu** Reference: **Proposed Permit Limit** | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): **0.06 lb/MMBtu x 760 MMBtu/hr = 45.6 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.06 lb/MMBtu** | 4. Equivalent Allowable Emissions: **45.6** lb/hour **199.7** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Annual stack test using EPA Method 25A/18.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **Lead** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.11** lb/hour **0.50** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **1.5 x $10^{-4}$ lb/MMBtu** Reference: **Proposed BACT Limit** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **1.5 x $10^{-4}$ lb/MMBtu x 760 MMBtu/hr = 0.11 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **1.5 x $10^{-4}$ lb/MMBtu** | 4. Equivalent Allowable Emissions: **0.11** lb/hour **0.50** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Stack test using EPA Method 12, once every 5 years.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **SAM** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **13.98** lb/hour **12.23** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.0184 lb/MMBtu** Reference: **AP-42** | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): **3-Hour average: 0.0184 lb/MMBtu x 760 MMBtu/hr = 13.98 lb/hr** **Annual average = 0.0037 lb/MMBtu x 760 MMBtu/hr x 8,760 hr/yr x 1 ton/2,000 lb = 12.23 TPY** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **Fluorides** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.53** lb/hour **2.33** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **7 x $10^{-4}$ lb/MMBtu** Reference: **Similar Stack Test Data** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **7 x $10^{-4}$ lb/MMBtu x 760 MMBtu/hr = 0.53 lb/hr** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H114** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.0041** lb/hour **0.018** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **5.4 x $10^{-6}$ lb/MMBtu** Reference: **Proposed Permit Limit** | 7. Emissions Method Code: **0** |
| 8. Calculation of Emissions (limit to 600 characters): **5.4 x $10^{-6}$ lb/MMBtu x 760 MMBtu/hr = 0.0041** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on biomass firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **5.4 x $10^{-6}$ lb/MMBtu** | 4. Equivalent Allowable Emissions: **0.0041** lb/hour **0.018** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Stack test once every 5 years using EPA Method 29.** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on biomass firing.** | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

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

| | |
|---|---|
| 1. Visible Emissions Subtype: VE20 | 2. Basis for Allowable Opacity: [ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: 20 % Exceptional Conditions: 27 % Maximum Period of Excess Opacity Allowed: 6 min/hour | |
| 4. Method of Compliance: EPA Method 9 | |
| 5. Visible Emissions Comment (limit to 200 characters): 40 CFR 60, Subpart Da | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 1 of 6

| | |
|---|---|
| 1. Parameter Code: VE | 2. Pollutant(s): |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: Durag Model Number: D-R281-31-AV Serial Number: 31500 | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): 40 CFR 60, Subpart Da | |

## H. VISIBLE EMISSIONS INFORMATION
### (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation ____ of ____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
### (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 2 of 6

| | |
|---|---|
| 1. Parameter Code: **EM** | 2. Pollutant(s): **$NO_x$** |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: **Thermo Environmental Instruments** Model Number: **42D** Serial Number: **42D-53361-296** | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 60, Subpart Da** | |

## H. VISIBLE EMISSIONS INFORMATION
### (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
### (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 3 of 6

| | |
|---|---|
| 1. Parameter Code: **EM** | 2. Pollutant(s): **$SO_2$** |
| 3. CMS Requirement: | [ ] Rule [ X ] Other |
| 4. Monitor Information: Manufacturer: **Thermo Environmental Instruments** Model Number: **43B** Serial Number: **43B-53359-296** | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 60, Subpart Da** | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation _____ of _____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity:<br>[ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 4 of 6

| | |
|---|---|
| 1. Parameter Code: EM | 2. Pollutant(s): CO |
| 3. CMS Requirement: | [ ] Rule [ X ] Other |
| 4. Monitor Information:<br>Manufacturer: Thermo Environmental Instruments<br>Model Number: 48 Serial Number: 48-53434-296 | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation ____ of ____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity:<br>[ ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: % Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor 5 of 6

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): $O_2$ |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer: **Yokogowa**<br>Model Number: **ZA8C** Serial Number: **JJ113 PA188** | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters):<br>**40 CFR 60, Subpart Da** | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

**Visible Emissions Limitation:** Visible Emissions Limitation ____ of ____

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity: [ ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance: | |
| 5. Visible Emissions Comment (limit to 200 characters): | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

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

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): $CO_2$ |
| 3. CMS Requirement: | [ ] Rule [ X ] Other |
| 4. Monitor Information: Manufacturer: California Analytical Model Number: ZRH1 Serial Number: N5B3528T | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements**

| | |
|---|---|
| 1. Process Flow Diagram<br>[ X ] Attached, Document ID: PB-FI-C3 [ ] Not Applicable [ ] Waiver Requested | |
| 2. Fuel Analysis or Specification<br>[ X ] Attached, Document ID: PB-EU2-J2 [ ] Not Applicable [ ] Waiver Requested | |
| 3. Detailed Description of Control Equipment<br>[ X ] Attached, Document ID: PB-EU2-J3 [ ] Not Applicable [ ] Waiver Requested | |
| 4. Description of Stack Sampling Facilities<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable [ ] Waiver Requested | |
| 5. Compliance Test Report<br>[ ] Attached, Document ID:_____<br>[ ] Previously submitted, Date:_____<br>[ X ] Not Applicable | |
| 6. Procedures for Startup and Shutdown<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable [ ] Waiver Requested | |
| 7. Operation and Maintenance Plan<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable [ ] Waiver Requested | |
| 8. Supplemental Information for Construction Permit Application<br>[ X ] Attached, Document ID: PSD Report [ ] Not Applicable | |
| 9. Other Information Required by Rule or Statute<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable | |
| 10. Supplemental Requirements Comment: | |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

| |
|---|
| 11. Alternative Methods of Operation<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 12. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 13. Identification of Additional Applicable Requirements<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable |
| 14. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 15. Acid Rain Part Application (Hard-copy Required)<br>[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID:_____<br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:_____<br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:_____<br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:_____<br>[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)<br>Attached, Document ID:_____<br>[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)<br>Attached, Document ID:_____<br>[ X ] Not Applicable |

# ATTACHMENT PB-EU2-C

# LIST OF APPLICABLE REGULATIONS

**Attachment PB-EU2-C - List of Applicable Regulations**

**Cogen Boiler No. 2 - Rule Applicability for Palm Beach Power Corp.**

| APPLIC STAT | RULE DESCRIP | RULE NUMBER | RULE TITLE | RATIONALE FOR NON-APPLICABILITY |
|---|---|---|---|---|
| APPLICABLE | 60 Subpart A | 40CFR60.1 | Subpart A -- General Provisions | |
| APPLICABLE | 60 Subpart A | 40CFR60.7 | Notification and Record Keeping | |
| APPLICABLE | 60Subpart A | 40CFR60.8 | Performance Testing | |
| APPLICABLE | 60 Subpart A | 40CFR60.11 | Compliance with standards and maintenance requirements. | |
| APPLICABLE | 60 Subpart A | 40CFR60.12 | Circumvention. | |
| APPLICABLE | 60 Subpart A | 40CFR60.13 | Monitoring requirements. | |
| APPLICABLE | 60 Subpart A | 40CFR60.19 | General notification and reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.40a | Subpart Da - NSPS for Electric Utility Units for which construction commenced after Sept. 18, 1978. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.42a | Standard for particulate matter | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(a) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(b) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(d)(2) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(g) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.43a(h) | Standard for sulfur dioxide. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.44a | Standard for nitrogen oxides | |
| APPLICABLE | 60 Subpart Da | 40CFR60.44a(a) | Standard for nitrogen oxides | |
| APPLICABLE | 60 Subpart Da | 40CFR60.44a(c) | Standard for nitrogen oxides | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(a) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(b) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(c) | Compliance provisions. | |
| NON-APPLICABLE | 60 Subpart Da | 40CFR60.46a(d) | Compliance provisions. | Cogen Boiler 2 does not have a flue gas desulfurization system. |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(e) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(f) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(g) | Compliance provisions. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.46a(h) | Compliance provisions. | |
| NON-APPLICABLE | 60 Subpart Da | 40CFR60.46a(i) | Compliance provisions. | Cogen Boiler 2 has not been modified after July 7, 1997. |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(a) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(b)(2) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(b)(3) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(c)(1) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(d) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(e) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(f) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(g) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(h) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(i) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.47a(j) | Emission monitoring | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(a) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(b) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(c) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(d) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.48a(e) | Compliance determination procedures and methods. | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(a) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(b) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(c) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(d) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(f) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(g) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(h) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(i) | Reporting requirements | |
| APPLICABLE | 60 Subpart Da | 40CFR60.49a(j) | Reporting requirements | |

**Cogen Boiler No. 2 - Rule Applicability for Palm Beach Power Corp.**

| APPLIC STAT | RULE DESCRIP | RULE NUMBER | RULE TITLE | RATIONALE FOR NON-APPLICABILITY |
|---|---|---|---|---|
| APPLICABLE | 60 Subpart Ea | 40CFR60.50a(d) | Standards of performance for municipal waste combustors | |
| APPLICABLE | 60 Subpart Ea | 40CFR60.50b(j) | Standards of performance for municipal waste combustors | |
| APPLICABLE | 62-204 | 62-204.800(7)2. | NSPS Subpart Da adopted by reference. | |
| APPLICABLE | 62-296 < | 62-296 | STATIONARY SOURCES - EMISSION STANDARDS | |
| APPLICABLE | 62-296 < | 62-296.405(2) | Fossil Fuel Steam Generators with more than 250 million Btu per Hour Heat Input. | |
| NON-APPLICABLE | 62-296 < | 62-296.406 | Fossil Fuel Steam Generators with less than 250 Million Btu per Hour Heat Input, New and Existing Em | Cogen Boiler 2 has a heat input of >250 MMBtu/hr. |
| NON-APPLICABLE | 62-296 < | 62-296.410 | Carbonaceous Fuel Burning Equipment. | Not more stringent or different than NSPS. |
| APPLICABLE | 62-296 > | 62-296.500 | Reasonably Available Control Technology (RACT) - Volatile Organic Compounds (VOC) and Nitrogen Oxide | |
| APPLICABLE | 62-296 > | 62-296.500(2)(a) | Reasonably Available Control Technology (RACT) - Volatile Organic Compounds (VOC) and Nitrogen Oxide | |
| APPLICABLE | 62-296 > | 62-296.500(2)(c) | Reasonably Available Control Technology (RACT) - Volatile Organic Compounds (VOC) and Nitrogen Oxide | |
| APPLICABLE | 62-296 > | 62-296.570 | Reasonably Available Control Technology (RACT) - Requirements for Major VOC- and NOx-Emitting Facility | |
| APPLICABLE | 62-296 > | 62-296.570(1) | Applicability. | |
| APPLICABLE | 62-296 > | 62-296.570(1)(a) | Applicability. | |
| APPLICABLE | 62-296 > | 62-296.570(2) | Compliance Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(3) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4)(a) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4)(b)6. | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.570(4)(c) | Operation Permit Requirements. | |
| APPLICABLE | 62-296 > | 62-296.620 | | |
| NON-APPLICABLE | 62-296 > | 62-296.700 | Reasonably Available Control Technology (RACT) Particulate Matter. | Palm Beach Power Corp. is located in Palm Beach County, which is not a nonattainment or maintenance area for particulate matter. |
| NON-APPLICABLE | 62-296 > | 62-296.702 | Fossil Fuel Steam Generators. | Palm Beach Power Corp. is located in Palm Beach County, which is not a nonattainment or maintenance area for particulate matter. |
| NON-APPLICABLE | 62-296 > | 62-296.703 | Carbonaceous Fuel Burners. | Palm Beach Power Corp. is located in Palm Beach County, which is not a nonattainment or maintenance area for particulate matter. |
| APPLICABLE | 62-297 | 62-297 | STATIONARY SOURCES - EMISSIONS MONITORING | |
| APPLICABLE | 62-297 | 62-297.310 | General Compliance Test Requirements. | |
| APPLICABLE | 62-297 | 62-297.401 | Compliance Test Methods. | |
| APPLICABLE | 62-297 | 62-297.401(1)(a) | EPA Method 1 - Sample and Velocity Traverses for Stationary sources - 40 CFR 60 Appendix A. | |
| APPLICABLE | 62-297 | 62-297.401(10) | EPA Method 10 - Determination of Carbon Monoxide Emissions from Stationary Sources - 40 CFR 60 Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(12) | EPA Method 12 - Determination of Inorganic Lead Emissions from Stationary Sources - 40 CFR 60 Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(18) | EPA Method 18 - Measurement of Gaseous Organic Compound Emissions by Gas Chromatography - 40 CFR 60 Appendix A | |

**Cogen Boiler No. 2 - Rule Applicability for Palm Beach Power Corp.**

| APPLIC STAT | RULE DESCRIP | RULE NUMBER | RULE TITLE | RATIONALE FOR NON-APPLICABILITY |
|---|---|---|---|---|
| APPLICABLE | 62-297 | 62-297.401(19) | EPA Method 19 - Determination of Sulfur Dioxide Removal Efficiency and Particulate, Sulfur Dioxide | |
| APPLICABLE | 62-297 | 62-297.401(2) | EPA Method 2 - Determination of Stack Gas Velocity and Volumetric Flow Rate - 40 CFR 60 Appendix A. | |
| APPLICABLE | 62-297 | 62-297.401(25) | EPA Method 25A - Determination of Total Gaseous Organic Concentraiton Using a Flame Ioinization Analyzer - 40 | |
| APPLICABLE | 62-297 | 62-297.401(3) | EPA Method 3A - Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources - 40 CFR 60. | |
| APPLICABLE | 62-297 | 62-297.401(32)(a) | EPA Method 101A - Determination of Particulate and Gaseous Mercury Emissions from Sewage Sludge Incinerators - 40 CFR 60, Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(4) | EPA Method 4 - Determination of Moisture Content in Stack Gases - 40 CFR 60 Appendix A. | |
| APPLICABLE | 62-297 | 62-297.401(5) | EPA Method 5 - Determination of Particulate Emissions from Stationary Sources - 40 CFR 60 Appendix A | |
| APPLICABLE | 62-297 | 62-297.401(6) | EPA Method 6 - Determination of Sulfur Dioxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(6)(c) | EPA Method 6C - Determination of Sulfur Dioxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(7) | EPA Method 7 - Determination of Nitrogen Oxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(7)(c) | EPA Method 7E - Determination of Nitrogen Oxide Emissions from Stationary Sources - 40 CFR 60 Appendix | |
| APPLICABLE | 62-297 | 62-297.401(9) | EPA Test Method 9 | |
| APPLICABLE | 62-297 | 62-297.401(29) | EPA Test Method 29 - Determination of Metals Emissions from Stationary Sources | |

# ATTACHMENT PB-EU2-J2

# FUEL ANALYSIS OR SPECIFICATION

# ATTACHMENT PB-EU2-J2
# DESIGN FUEL SPECIFICATIONS[a] FOR THE PALM BEACH POWER CORP. COGENERATION FACILITY

| Parameter | | Biomass | | | |
|---|---|---|---|---|---|
| | | Bagasse | Wood Waste | No. 2 Fuel Oil | Natural Gas |
| Specific Gravity | | – | – | 0.865 | – |
| Heating Value | (Btu/lb) | 3,600 | 4,500 | 19,175 | – |
| Heating Value | (Btu/gal) | – | – | 138,000 | – |
| Heating Value | (Btu/scf) | | | | 1,000 |
| Ultimate Analysis (dry basis percentage): | | | | | |
| Carbon | | 48.93 | 49.58 | 87.01 | 82.96 |
| Hydrogen | | 6.14 | 5.87 | 12.47 | 5.41 |
| Nitrogen | | 0.25 | 0.40 | 0.02 | 1.58 |
| Oxygen | | 43.84 | 40.90 | 0.00 | 5.72 |
| Sulfur | | 0.03 | 0.07 | 0.05 | 0.67 |
| Ash/Inorganic | | 1.0 | 9.0 | 0.00 | 3.66 |
| Moisture | | 52-55 | 37 | – | 4.5 |

[a] Represents average fuel characteristics.

Sources: Palm Beach Power Corp., 2002.
Combustion Engineering, 1981.

# ATTACHMENT PB-EU2-J3

# DETAILED DESCRIPTION OF CONTROL EQUIPMENT

# ATTACHMENT PB-EU2-J3

## DETAILED DESCRIPTION OF CONTROL EQUIPMENT

The Palm Beach Power Corp. (PBPC) cogeneration facility will utilize several emission control techniques to reduce emissions. A selective non-catalytic reduction (SNCR) system will be used to reduce $NO_x$ emissions. SNCR is a system which injects urea into the boiler to reduce $NO_x$ emissions. Further, the cogeneration boilers will minimize CO and VOC through proper furnace design and good combustion practices, including: control of combustion air and combustion temperature; distribution of fuel on the combustion grate; and better controls over the furnace loads and transient conditions. Particulate emissions will be controlled by an ESP. Mechanical dust collectors will be installed to improve control of particulate emissions.

Electrostatic Precipitator

The ESP for the PBPC facility was manufactured by ABB Environmental Services. Design specifications for the ESP (one per boiler) are provided below:

Chambers = 1
Collecting Plate=12.30 ft L x 39.37 ft H
Fields/Chamber = 3
Specific Collection Area = 200 $ft^2$/1,000 acfm (minimum)
Gas Velocity -= <4 ft/s
Pressure Drop = less than 2.8 inches $H_2O$
Operating Temperature = 350°F
Ash Handling = Trough hopper with screw conveyor
Particulate removal efficiency = >99.2%

$NO_x$ Control System

A urea injection system manufactured by Nalco-Fueltech has been installed for $NO_x$ control. The technology is a selective non-catalytic reduction process, which reduces $NO_x$ emissions through chemical reaction with urea. In the process, urea will be injected into the flue gas stream to react with nitrogen oxides to form nitrogen and water vapor.

The $NO_x$ control system includes the following major components:

- Carrier air compressors,
- Urea tank,
- Urea/air flow controls,
- Control Panel,
- Injection manifolds and injectors, and
- Valves and instrumentation.

A single urea storage tank system will supply urea to both boilers. Urea for injection into the boiler will be drawn from the tank. Three injection zones will be used to provide injection at full and part load conditions. The first zone will have four injectors, and the second and third zones will have six injectors each, for a total of sixteen injectors. Zone switching valves will direct the urea/carrier mixture to the appropriate injection zone.

Specifications for the urea injection system to meet the proposed $NO_x$ emission rate of 0.15 lb/MMBtu are provided below (on a per boiler basis):

| | |
|---|---|
| Urea injection rate | 65 gal/hr (max) |
| Ammonia slip | Biomass - 25 ppm (max) |
| | Oil and natural gas - 65 ppm (max) |

Dust Control System

The cyclone dust collectors will be supplied by Barron Industries, Model 460 Tube Base III 9K15-2023AU or equivalent. These are mechanical cyclone dust collectors, which remove larger size particulate matter prior to the ESP. There will be 460 cyclone tubes in all.

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

### A. GENERAL EMISSIONS UNIT INFORMATION
### (All Emissions Units)

**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).

[ X ] 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. Regulated or Unregulated Emissions Unit? (Check one)

[ X ] 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.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):
**Emissions from biomass/ash handling at Palm Beach Power Corp.**

4. Emissions Unit Identification Number:
ID:
[ ] No ID
[ ] ID Unknown

| 5. Emissions Unit Status Code: | 6. Initial Startup Date: | 7. Emissions Unit Major Group SIC Code: | 8. Acid Rain Unit? |
|---|---|---|---|
| C | | 49 | [ ] |

9. Emissions Unit Comment: (Limit to 500 Characters)

## Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   **Baghouse**
   **Enclosures**

2. Control Device or Method Code(s): **18, 54**

## Emissions Unit Details

| | | |
|---|---|---|
| 1. Package Unit: | | |
| Manufacturer: | Model Number: | |
| 2. Generator Nameplate Rating: | MW | |
| 3. Incinerator Information: | | |
| Dwell Temperature: | | °F |
| Dwell Time: | | seconds |
| Incinerator Afterburner Temperature: | | °F |

## B. EMISSIONS UNIT CAPACITY INFORMATION
## (Regulated Emissions Units Only)

**Emissions Unit Operating Capacity and Schedule**

| | | | |
|---|---|---|---|
| 1. Maximum Heat Input Rate: | | | mmBtu/hr |
| 2. Maximum Incineration Rate: | lb/hr | | tons/day |
| 3. Maximum Process or Throughput Rate: | 1,672,955 | | |
| 4. Maximum Production Rate: | | | |
| 5. Requested Maximum Operating Schedule: | | | |
| | 24 hours/day | 7 | days/week |
| | 52 weeks/year | 8,760 | hours/year |
| 6. Operating Capacity/Schedule Comment (limit to 200 characters): | | | |
| 708,183 TPY wood waste; 964,772 TPY bagassse. | | | |

## C. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

**List of Applicable Regulations**

| |
|---|
| 62-296.320(4)(c) |
| 62-296.320(4)(b) |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |
| |

## D. EMISSION POINT (STACK/VENT) INFORMATION
## (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | |
|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram?<br>**Material Handling System** | 2. Emission Point Type Code:<br>**3** |
| 3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point):<br><br>**Fly ash silo**<br>**Conveyor transfer points**<br>**Hogger**<br>**Biomass storage pile** | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | |

| | | |
|---|---|---|
| 5. Discharge Type Code:<br>**F** | 6. Stack Height:<br>feet | 7. Exit Diameter:<br>feet |
| 8. Exit Temperature:<br>**77** °F | 9. Actual Volumetric Flow Rate:<br>acfm | 10. Water Vapor:<br>% |

| | |
|---|---|
| 11. Maximum Dry Standard Flow Rate:<br>dscfm | 12. Nonstack Emission Point Height:<br>**10** feet |
| 13. Emission Point UTM Coordinates:<br>Zone: East (km): North (km): | |
| 14. Emission Point Comment (limit to 200 characters): | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

**Segment Description and Rate:** Segment 1 of 1

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters):<br>**Pulp, paper, and wood products; fugitive emissions.** | | |
| 2. Source Classification Code (SCC):<br>**30788801** | 3. SCC Units:<br>**Tons produced or manufactured** | |
| 4. Maximum Hourly Rate: | 5. Maximum Annual Rate:<br>**1,672,955** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: |
| 10. Segment Comment (limit to 200 characters):<br>**Segment represents biomass handling and storage operations.** | | |

**Segment Description and Rate:** Segment _____ of _____

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): | | |
| 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 (limit to 200 characters): | | |

## F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| PM | | | WP |
| $PM_{10}$ | | | WP |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: PM | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour 7.77 tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): Refer to Table 2-6 in the PSD Report. | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: $PM_{10}$ | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour 2.53 tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): **Refer to Table 2-6 in the PSD Report.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## H. VISIBLE EMISSIONS INFORMATION
## (Only Regulated Emissions Units Subject to a VE Limitation)

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

| | |
|---|---|
| 1. Visible Emissions Subtype: | 2. Basis for Allowable Opacity:<br>[ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity:<br>Normal Conditions: 20% Exceptional Conditions: %<br>Maximum Period of Excess Opacity Allowed: min/hour | |
| 4. Method of Compliance:<br>VE test using Method 9 | |
| 5. Visible Emissions Comment (limit to 200 characters):<br>62-296.320(4)(b) | |

## I. CONTINUOUS MONITOR INFORMATION
## (Only Regulated Emissions Units Subject to Continuous Monitoring)

**Continuous Monitoring System:** Continuous Monitor _____ of _____

| | |
|---|---|
| 1. Parameter Code: | 2. Pollutant(s): |
| 3. CMS Requirement: | [ ] Rule [ ] Other |
| 4. Monitor Information:<br>Manufacturer:<br>Model Number: Serial Number: | |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): | |

## J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
## (Regulated Emissions Units Only)

**Supplemental Requirements**

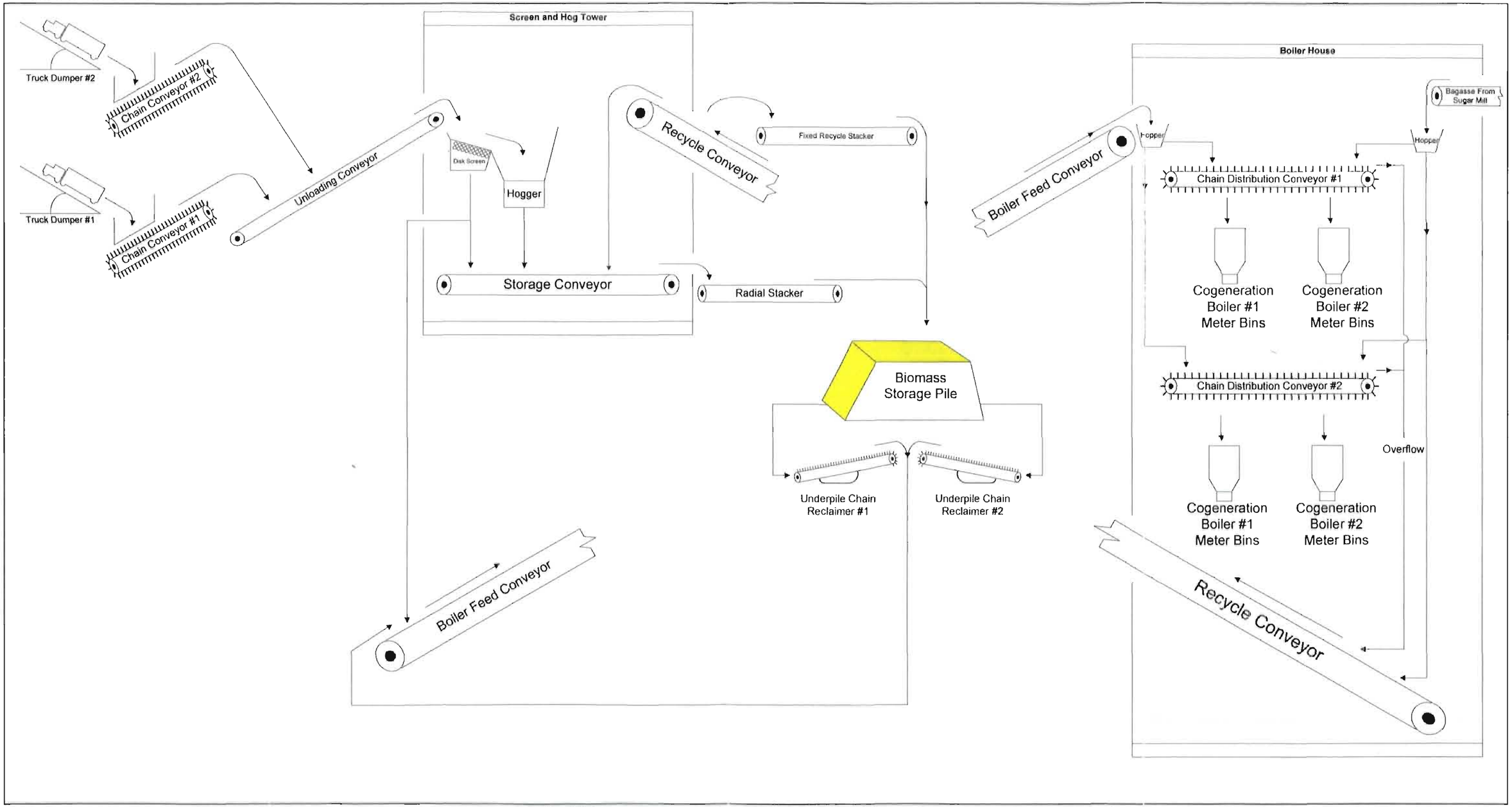
| |
|---|
| 1. Process Flow Diagram<br>[ X ] Attached, Document ID: PB-EU3-J1 [ ] Not Applicable [ ] Waiver Requested |
| 2. Fuel Analysis or Specification<br>[ ] Attached, Document ID: _____ [ X] Not Applicable [ ] Waiver Requested |
| 3. Detailed Description of Control Equipment<br>[ X ] Attached, Document ID: Appendix A [ ] Not Applicable [ ] Waiver Requested |
| 4. Description of Stack Sampling Facilities<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 5. Compliance Test Report<br>[ ] Attached, Document ID: _____<br>[ ] Previously submitted, Date: _____<br>[ X] Not Applicable |
| 6. Procedures for Startup and Shutdown<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 7. Operation and Maintenance Plan<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 8. Supplemental Information for Construction Permit Application<br>[X ] Attached, Document ID: PSD Report [ ] Not Applicable |
| 9. Other Information Required by Rule or Statute<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable |
| 10. Supplemental Requirements Comment: |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

| |
|---|
| 11. Alternative Methods of Operation<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 12. Alternative Modes of Operation (Emissions Trading)<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 13. Identification of Additional Applicable Requirements<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable |
| 14. Compliance Assurance Monitoring Plan<br>[ ] Attached, Document ID:_____ [ X ] Not Applicable |
| 15. Acid Rain Part Application (Hard-copy Required)<br>[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))<br>Attached, Document ID:_____<br>[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)<br>Attached, Document ID:_____<br>[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)<br>Attached, Document ID:_____<br>[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)<br>Attached, Document ID:_____<br>[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)<br>Attached, Document ID:_____<br>[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)<br>Attached, Document ID:_____<br>[ X ] Not Applicable |

**ATTACHMENT PB-EU3-J1**

**PROCESS FLOW DIAGRAM**




Attachment PB-EU3-J1
Palm Beach Power Material Handling System

Palm Beach Power Corp. | Pahokee, Florida

***Legend***

Bagasse and/or Wood Chips →

Golder Associates

## III. EMISSIONS UNIT INFORMATION

A separate Emissions Unit Information Section (including subsections A through J as required) must be completed for each emissions unit addressed in this Application for Air Permit. If submitting the application form in hard copy, indicate, in the space provided at the top of each page, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application.

### A. GENERAL EMISSIONS UNIT INFORMATION
### (All Emissions Units)

**Emissions Unit Description and Status**

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

[ X ] 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. Regulated or Unregulated Emissions Unit? (Check one)

[ X ] 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.

3. Description of Emissions Unit Addressed in This Section (limit to 60 characters):

**Package Boiler**

4. Emissions Unit Identification Number: [ X ] No ID
ID: [ ] ID Unknown

| 5. Emissions Unit Status Code: | 6. Initial Startup Date: | 7. Emissions Unit Major Group SIC Code: | 8. Acid Rain Unit? |
|---|---|---|---|
| **C** | | **20** | [ ] |

9. Emissions Unit Comment: (Limit to 500 Characters)

**Package Boiler equipped with Lo-$NO_x$ burners for No. 2 distillate fuel oil and natural gas.**

## Emissions Unit Control Equipment

1. Control Equipment/Method Description (Limit to 200 characters per device or method):

   **Lo-$NO_x$ Burners**

2. Control Device or Method Code(s): **024**

## Emissions Unit Details

1. Package Unit:
   Manufacturer: Model Number:
2. Generator Nameplate Rating: MW
3. Incinerator Information:
   Dwell Temperature: °F
   Dwell Time: seconds
   Incinerator Afterburner Temperature: °F

## B. EMISSIONS UNIT CAPACITY INFORMATION
(Regulated Emissions Units Only)

**Emissions Unit Operating Capacity and Schedule**

| | | | | |
|---|---|---|---|---|
| 1. Maximum Heat Input Rate: | | | 211 | mmBtu/hr |
| 2. Maximum Incineration Rate: | lb/hr | | | tons/day |
| 3. Maximum Process or Throughput Rate: | | | | tons/hr |
| 4. Maximum Production Rate: | | 150,000 | | |
| 5. Requested Maximum Operating Schedule: | | | | |
| 24 | hours/day | | 7 | days/week |
| 5 | weeks/year | | 8,760 | hours/year |

6. Operating Capacity/Schedule Comment (limit to 200 characters):

**Maximum heat input rate for natural gas firing.**

## C. EMISSIONS UNIT REGULATIONS
## (Regulated Emissions Units Only)

**List of Applicable Regulations**

| | |
|---|---|
| 40 CFR 60.11 General NSPS Requirement | 40 CFR 60.44b(i) 40 CFR 60 Subpart Db |
| 40 CFR 60.12 General NSPS Requirement | 40 CFR 60.45b(j) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(a) General NSPS Requirement | 40 CFR 60.46b(a) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(b) General NSPS Requirement | 40 CFR 60.46b(c) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(c) General NSPS Requirement | 40 CFR 60.46b(d)(7) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(d) General NSPS Requirement | 40 CFR 60.46b(e)(1) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(e) General NSPS Requirement | 40 CFR 60.46b(e)(4) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(f) General NSPS Requirement | 40 CFR 60.47b(f) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(h) General NSPS Requirement | 40 CFR 60.48b(a) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(i) General NSPS Requirement | 40 CFR 60.48b(b) 40 CFR 60 Subpart Db |
| 40 CFR 60.13(j) General NSPS Requirement | 40 CFR 60.48b(c) 40 CFR 60 Subpart Db |
| 40 CFR 60.19 General NSPS Requirement | 40 CFR 60.48b(d) 40 CFR 60 Subpart Db |
| 40 CFR 60.42b(a) 40 CFR 60 Subpart Db | 40 CFR 60.48b(e)(2) 40 CFR 60 Subpart Db |
| 40 CFR 60.42b(g) 40 CFR 60 Subpart Db | 40 CFR 60.48b(e)(3) 40 CFR 60 Subpart Db |
| 40 CFR 60.42b(j) 40 CFR 60 Subpart Db | 40 CFR 60.48b(f) 40 CFR 60 Subpart Db |
| 40 CFR 60.43b(f) 40 CFR 60 Subpart Db | 40 CFR 60.49b(a) 40 CFR 60 Subpart Db |
| 40 CFR 60.43b(g) 40 CFR 60 Subpart Db | 40 CFR 60.49b(b) 40 CFR 60 Subpart Db |
| 40 CFR 60.44b(a)(1)(ii) 40 CFR 60 Subpart Db | 40 CFR 60.49b(d) 40 CFR 60 Subpart Db |
| 40 CFR 60.44b(h) 40 CFR 60 Subpart Db | 40 CFR 60.49b(f) 40 CFR 60 Subpart Db |

## C. EMISSIONS UNIT REGULATIONS
(Regulated Emissions Units Only)

List of Applicable Regulations (continued)

| | |
|---|---|
| 40 CFR 60.49b(g) 40 CFR 60 Subpart Db | |
| 40 CFR 60.49b(h) 40 CFR 60 Subpart Db | |
| 40 CFR 60.49b(i) 40 CFR 60 Subpart Db | |
| 40 CFR 60.49b(o) 40 CFR 60 Subpart Db | |
| 40 CFR 60.49b(r) 40 CFR 60 Subpart Db | |
| 40 CFR 60.7 General NSPS Requirements | |
| 40 CFR 60.8 General NSPS Requirements | |
| 62-212.400(2) Stationary Sources - Preconstruction Review Requirements | |
| 62-212.400(5) Preconstruction Review Requirements | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

## D. EMISSION POINT (STACK/VENT) INFORMATION
### (Regulated Emissions Units Only)

**Emission Point Description and Type**

| | | |
|---|---|---|
| 1. Identification of Point on Plot Plan or Flow Diagram? **Package Boiler** | 2. Emission Point Type Code: **1** | |
| 3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking (limit to 100 characters per point): | | |
| 4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common: | | |
| 5. Discharge Type Code: **V** | 6. Stack Height: **75** feet | 7. Exit Diameter: **5.0** feet |
| 8. Exit Temperature: **410** °F | 9. Actual Volumetric Flow Rate: **88,200** 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 Comment (limit to 200 characters): **Stack parameters are based on stack test data for Okeelanta's package boiler (Boiler No. 16).** | | |

## E. SEGMENT (PROCESS/FUEL) INFORMATION
(All Emissions Units)

**Segment Description and Rate:** Segment 1 of 2

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type) (limit to 500 characters): **Industrial Boiler - Distillate Oil, Grades 1 and 2 Oil** | | |
| 2. Source Classification Code (SCC): **1-02-005-01** | 3. SCC Units: **Thousand Gallons Burned (all liquid fuels)** | |
| 4. Maximum Hourly Rate: **1.485** | 5. Maximum Annual Rate: **13,010** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: **0.05** | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: **136** |
| 10. Segment Comment (limit to 200 characters): **Based on 202 MMBtu/hr while firing No. 2 fuel oil. Maximum Annual Rate based on 8,760 hr/yr.** | | |

**Segment Description and Rate:** Segment 2 of 2

| | | |
|---|---|---|
| 1. Segment Description (Process/Fuel Type ) (limit to 500 characters): **Industrial Boiler, natural gas greater than 100 MMBtu/hr** | | |
| 2. Source Classification Code (SCC): **1-02-006-01** | 3. SCC Units: **Million Cubic Feet Burned** | |
| 4. Maximum Hourly Rate: **0.207** | 5. Maximum Annual Rate: **1812.12** | 6. Estimated Annual Activity Factor: |
| 7. Maximum % Sulfur: | 8. Maximum % Ash: | 9. Million Btu per SCC Unit: **1,020** |
| 10. Segment Comment (limit to 200 characters): **Based on 211 MMBtu/hr while firing natural gas.** | | |

## F. EMISSIONS UNIT POLLUTANTS
(All Emissions Units)

| 1. Pollutant Emitted | 2. Primary Control Device Code | 3. Secondary Control Device Code | 4. Pollutant Regulatory Code |
|---|---|---|---|
| PM | | | NS |
| $PM_{10}$ | | | NS |
| $SO_2$ | | | EL |
| $NO_x$ | | | EL |
| CO | | | NS |
| VOC | | | NS |
| SAM | | | NS |
| Pb | | | NS |
| H114 | | | NS |
| H021 | | | NS |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **PM** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **6.46** lb/hour **28.31** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.032 lb/MMBtu** Reference: **Emission test results** | 7. Emissions Method Code: **1** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Maximum annual emissions based on firing both natural gas and fuel oil. Emission factor given is based on emission tests for similar boiler while firing fuel oil.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$PM_{10}$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **6.46** lb/hour **28.31** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.032 lb/MMBtu** Reference: **Emission test results** | 7. Emissions Method Code: **1** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Assumed $PM_{10}$ is 100 percent of PM.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$SO_2$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **11.66** lb/hour **51.07** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.058 lb/MMBtu** Reference: **AP-42, Table 1.3-1** | 7. Emissions Method Code: **3** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on fuel oil firing.** | |

**Allowable Emissions** Allowable Emissions 1 of 1

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.05% S** | 4. Equivalent Allowable Emissions: **11.66** lb/hour **51.07** tons/year |
| 5. Method of Compliance (limit to 60 characters): **Fuel Analysis** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Limit is maximum sulfur content of No. 2 fuel oil.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **40.40** lb/hour **106.17** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.12 lb/MMBtu** Reference: **Proposed BACT** | 7. Emissions Method Code: **2** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Emission factor based on fuel oil firing. Hourly emissions based on 24-hr emission factor of 0.20 lb/MMBtu. Annual emissions based on a 30-day rolling average of 0.12 lb/MMBtu.** | |

**Allowable Emissions** Allowable Emissions 1 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.12 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **106.17** tons/year |
| 5. Method of Compliance (limit to 60 characters): **EPA Method 7, 7A, or 7E** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on fuel oil firing.** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
## (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **$NO_x$** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: lb/hour tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: Reference: | 7. Emissions Method Code: |
| 8. Calculation of Emissions (limit to 600 characters): | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): | |

**Allowable Emissions** Allowable Emissions 2 of 2

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: **OTHER** | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: **0.06 lb/MMBtu** | 4. Equivalent Allowable Emissions: lb/hour **55.45** tons/year |
| 5. Method of Compliance (limit to 60 characters): **EPA Method 7, 7A, or 7E** | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): **Based on natural gas firing (24-hr average). Annual emissions based on 0.06 lb/MMBtu (30-day rolling average).** | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: CO | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: 22.22 lb/hour 97.32 tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: 0.11 lb/MMBtu<br>Reference: Similar Boiler | 7. Emissions Method Code: 2 |
| 8. Calculation of Emissions (limit to 600 characters): See Table 2-6 for calculations. | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Emission factor based on fuel oil-firing. | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: VOC | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: 6.33 lb/hour 27.73 tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: 0.03 lb/MMBtu<br>Reference: Similar Boiler | 7. Emissions Method Code: 2 |
| 8. Calculation of Emissions (limit to 600 characters):<br>See Table 2-6 for calculations. | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters):<br>Based on natural gas firing. | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **SAM** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.52** lb/hour **2.27** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **0.0026 lb/MMBtu** Reference: **See Comment** | 7. Emissions Method Code: **3** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Emission factor based on the factor for $SO_3$ from fuel oil in AP-42, Section 1.3, then take into account the ratio of sulfuric acid mist and gaseous sulfate molecular weights (98/80).** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **Pb** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.0018** lb/hour **0.008** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **9.00 x $10^{-6}$ lb/MMBtu** Reference: **AP-42, Table 1.3-10 (9/98)** | 7. Emissions Method Code: **3** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on fuel oil firing.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
### (Regulated Emissions Units - Emissions-Limited and Preconstruction Review Pollutants Only)

**Potential/Fugitive Emissions**

| | | |
|---|---|---|
| 1. Pollutant Emitted: H114 | 2. Total Percent Efficiency of Control: | |
| 3. Potential Emissions: 0.00061 lb/hour | 0.0027 tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 | _____ to _____ tons/year | |
| 6. Emission Factor: $3 \times 10^{-6}$ lb/MMBtu<br>Reference: AP-42, Table 1.3-10 (9/98) | | 7. Emissions Method Code: 3 |
| 8. Calculation of Emissions (limit to 600 characters): See Table 2-6 for calculations. | | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): Based on fuel oil firing. | | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## G. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION
**(Regulated Emissions Units -.**
**Emissions-Limited and Preconstruction Review Pollutants Only)**

**Potential/Fugitive Emissions**

| | |
|---|---|
| 1. Pollutant Emitted: **H021** | 2. Total Percent Efficiency of Control: |
| 3. Potential Emissions: **0.00061** lb/hour **0.0027** tons/year | 4. Synthetically Limited? [ ] |
| 5. Range of Estimated Fugitive Emissions: [ ] 1 [ ] 2 [ ] 3 _____ to _____ tons/year | |
| 6. Emission Factor: **3 x $10^{-6}$ lb/MMBtu** Reference: **AP-42, Table 1.3-10 (9/98)** | 7. Emissions Method Code: **3** |
| 8. Calculation of Emissions (limit to 600 characters): **See Table 2-6 for calculations.** | |
| 9. Pollutant Potential/Fugitive Emissions Comment (limit to 200 characters): **Based on fuel oil firing.** | |

**Allowable Emissions** Allowable Emissions _____ of _____

| | |
|---|---|
| 1. Basis for Allowable Emissions Code: | 2. Future Effective Date of Allowable Emissions: |
| 3. Requested Allowable Emissions and Units: | 4. Equivalent Allowable Emissions: lb/hour tons/year |
| 5. Method of Compliance (limit to 60 characters): | |
| 6. Allowable Emissions Comment (Desc. of Operating Method) (limit to 200 characters): | |

## H. VISIBLE EMISSIONS INFORMATION
### (Only Regulated Emissions Units Subject to a VE Limitation)

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

| | |
|---|---|
| 1. Visible Emissions Subtype: **VE 20** | 2. Basis for Allowable Opacity: [ X ] Rule [ ] Other |
| 3. Requested Allowable Opacity: Normal Conditions: **20** % Exceptional Conditions: **27** % Maximum Period of Excess Opacity Allowed: **0** min/hour | |
| 4. Method of Compliance: **EPA Method 9** | |
| 5. Visible Emissions Comment (limit to 200 characters): **40 CFR 60 Subpart Db 60.43b** | |

## I. CONTINUOUS MONITOR INFORMATION
### (Only Regulated Emissions Units Subject to Continuous Monitoring)

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

| | |
|---|---|
| 1. Parameter Code: **VE** | 2. Pollutant(s): |
| 3. CMS Requirement: | [ X ] Rule [ ] Other |
| 4. Monitor Information: Manufacturer: Model Number: | Serial Number: |
| 5. Installation Date: | 6. Performance Specification Test Date: |
| 7. Continuous Monitor Comment (limit to 200 characters): **40 CFR 60 Subpart Db 60.42b(a).** | |

## J. EMISSIONS UNIT SUPPLEMENTAL INFORMATION
### (Regulated Emissions Units Only)

**Supplemental Requirements**

| | |
|---|---|
| 1. | Process Flow Diagram<br>[ X ] Attached, Document ID: PB-EU4-J1 [ ] Not Applicable [ ] Waiver Requested |
| 2. | Fuel Analysis or Specification<br>[ X ] Attached, Document ID: PB-EU4-J2 [ ] Not Applicable [ ] Waiver Requested |
| 3. | Detailed Description of Control Equipment<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 4. | Description of Stack Sampling Facilities<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 5. | Compliance Test Report<br>[ ] Attached, Document ID: _____<br>[ ] Previously submitted, Date: _____<br>[ X ] Not Applicable |
| 6. | Procedures for Startup and Shutdown<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 7. | Operation and Maintenance Plan<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable [ ] Waiver Requested |
| 8. | Supplemental Information for Construction Permit Application<br>[ X ] Attached, Document ID: See PSD Report [ ] Not Applicable |
| 9. | Other Information Required by Rule or Statute<br>[ ] Attached, Document ID: _____ [ X ] Not Applicable |
| 10. | Supplemental Requirements Comment: |

**Additional Supplemental Requirements for Title V Air Operation Permit Applications**

11. Alternative Methods of Operation
[ ] Attached, Document ID: _____ [ X ] Not Applicable

12. Alternative Modes of Operation (Emissions Trading)
[ ] Attached, Document ID:_____ [ X ] Not Applicable

13. Identification of Additional Applicable Requirements
[ ] Attached, Document ID: _____ [ X ] Not Applicable

14. Compliance Assurance Monitoring Plan
[ ] Attached, Document ID:_____ [ X ] Not Applicable

15. Acid Rain Part Application (Hard-copy Required)

[ ] Acid Rain Part - Phase II (Form No. 62-210.900(1)(a))
Attached, Document ID:_____

[ ] Repowering Extension Plan (Form No. 62-210.900(1)(a)1.)
Attached, Document ID:_____

[ ] New Unit Exemption (Form No. 62-210.900(1)(a)2.)
Attached, Document ID:_____

[ ] Retired Unit Exemption (Form No. 62-210.900(1)(a)3.)
Attached, Document ID:_____

[ ] Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.)
Attached, Document ID:_____

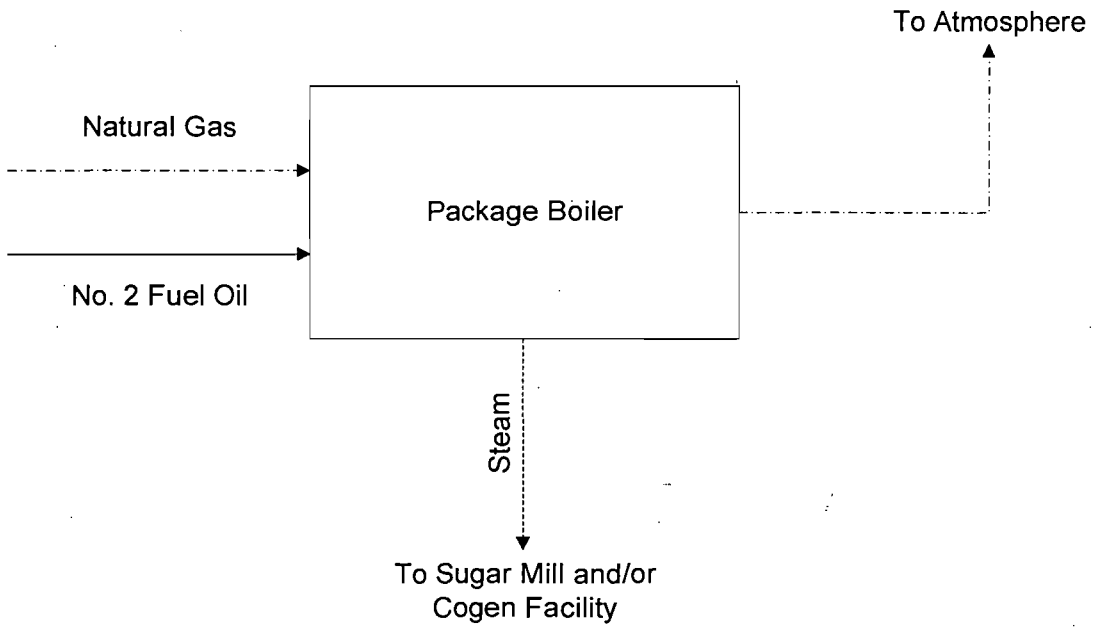
[ ] Phase NOx Averaging Plan (Form No. 62-210.900(1)(a)5.)
Attached, Document ID:_____

[ X ] Not Applicable

# ATTACHMENT PB-EU4-J1

# PROCESS FLOW DIAGRAM

0137678/4/4.4/4.4.1/PB-EU4-J1




Attachment PB-EU4-J1
Package Boiler
Process Flow Diagram
Palm Beach Power Corp.
Pahokee, FL

**Process Flow Legend**
Solid/Liquid
Gas
Steam

Package Boiler

Date: 04/01/02

Golder Associates

# ATTACHMENT PB-EU4-J2

# FUEL ANALYSIS OR SPECIFICATION

**ATTACHMENT PB-EU4-J2**
**DESIGN FUEL SPECIFICATIONS[a] FOR THE**
**PALM BEACH POWER CORP. PACKAGE BOILER**

| Parameter | | No. 2 Fuel Oil | Natural Gas |
|---|---|---|---|
| Specific Gravity | | 0.865 | – |
| Heating Value | (Btu/lb) | 19,175 | – |
| Heating Value | (Btu/gal) | 138,000 | – |
| Heating Value | (Btu/scf) | | 1,000 |
| Ultimate Analysis (dry basis percentage): | | | |
| Carbon | | 87.01 | 82.96 |
| Hydrogen | | 12.47 | 5.41 |
| Nitrogen | | 0.02 | 1.58 |
| Oxygen | | 0.00 | 5.72 |
| Sulfur | | 0.05 | 0.67 |
| Ash/Inorganic | | 0.00 | 3.66 |
| Moisture | | – | 4.5 |

[a] Represents average fuel characteristics.

Sources: Palm Beach Power Corp., 2002.
Combustion Engineering, 1981.

# PART B

# PSD REPORT

# TABLE OF CONTENTS


| SECTION | | | PAGE |
|---|---|---|---|
| 1.0 | SUMMARY | | 1-1 |
| 2.0 | PROJECT DESCRIPTION | | 2-1 |
| | 2.1 | GENERAL | 2-1 |
| | 2.2 | FACILITY DESCRIPTION | 2-2 |
| | | 2.2.1 COGENERATION BOILERS | 2-2 |
| | | 2.2.2 PACKAGE BOILER | 2-4 |
| | | 2.2.3 FUELS | 2-4 |
| | | 2.2.4 POLLUTION CONTROL EQUIPMENT | 2-6 |
| | | 2.2.5 BIOMASS FUEL HANDLING SYSTEM | 2-8 |
| | | 2.2.6 ASH HANDLING SYSTEM | 2-9 |
| | | 2.2.7 FUEL OIL STORAGE TANK | 2-10 |
| | | 2.2.8 STACK PARAMETERS | 2-10 |
| | | 2.2.9 FACILITY PLOT PLAN | 2-10 |
| | | 2.2.10 CONTINUOUS EMISSION MONITORING SYSTEMS | 2-11 |
| | 2.3 | APPLICABILITY OF FEDERAL NEW SOURCE PERFORMANCE STANDARDS | 2-11 |
| | | 2.3.1 NSPS FOR ELECTRIC UTILITY STEAM GENERATING UNITS | 2-11 |
| | | 2.3.2 NSPS FOR INDUSTRIAL-COMMERCIAL-INSTITUTIONAL STEAM GENERATING UNITS | 2-12 |
| | | 2.3.3 NSPS FOR MUNICIPAL SOLID WASTE COMBUSTORS | 2-13 |
| | | 2.3.4 NSPS FOR VOLATILE ORGANIC LIQUID STORAGE TANKS | 2-14 |
| | | 2.3.5 MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY REGULATIONS | 2-14 |
| | 2.4 | AIR EMISSIONS | 2-15 |
| | | 2.4.1 COGENERATION BOILERS | 2-15 |
| | | 2.4.2 PACKAGE BOILER | 2-17 |
| | | 2.4.3 MATERIAL HANDLING SYSTEM | 2-18 |
| | 2.5 | SIMULTANEOUS OPERATIONS WITH OSCEOLA FARMS BOILERS | 2-18 |
| 3.0 | AIR QUALITY REVIEW REQUIREMENTS | | 3-1 |

## TABLE OF CONTENTS


3.1 NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS (AAQS) ..... 3-1
3.2 PSD REQUIREMENTS ..... 3-1
3.2.1 GENERAL REQUIREMENTS ..... 3-1
3.2.2 CONTROL TECHNOLOGY REVIEW ..... 3-2
3.2.3 SOURCE IMPACT ANALYSIS ..... 3-4
3.2.4 AIR QUALITY MONITORING REQUIREMENTS ..... 3-6
3.2.5 SOURCE INFORMATION/GEP STACK HEIGHT ..... 3-7
3.2.6 ADDITIONAL IMPACT ANALYSIS ..... 3-8
3.3 NONATTAINMENT RULES ..... 3-8
3.4 EMISSION STANDARDS ..... 3-8
3.4.1 NEW SOURCE PERFORMANCE STANDARDS ..... 3-8
3.4.2 FLORIDA RULES ..... 3-9
3.5 SOURCE APPLICABILITY ..... 3-10
3.5.1 AREA CLASSIFICATION ..... 3-10
3.5.2 PSD REVIEW ..... 3-10
3.5.3 EMISSION STANDARDS ..... 3-12
4.0 AMBIENT MONITORING ANALYSIS ..... 4-1
4.1 MONITORING REQUIREMENTS ..... 4-1
4.2 $SO_2$ AMBIENT BACKGROUND CONCENTRATIONS ..... 4-2
4.3 CO AMBIENT BACKGROUND CONCENTRATIONS ..... 4-2
4.4 $PM_{10}$ AMBIENT BACKGROUND CONCENTRATIONS ..... 4-3
4.5 $NO_2$ AMBIENT BACKGROUND CONCENTRATIONS ..... 4-3
4.6 EVERGLADES NATIONAL PARK CLASS I AREA ..... 4-3
5.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS ..... 5-1
5.1 REQUIREMENTS ..... 5-1
5.2 COGENERATION BOILERS ..... 5-1
5.2.1 SULFUR DIOXIDE ..... 5-1
5.2.2 NITROGEN OXIDES ..... 5-6
5.2.3 FLUORIDES ..... 5-9
5.2.4 SULFURIC ACID MIST ..... 5-10

## TABLE OF CONTENTS


5.2.5 LEAD ..... 5-10
5.2.6 RACT ANALYSIS FOR VOC ..... 5-11
5.3 PACKAGE BOILER ..... 5-11
5.3.1 SULFUR DIOXIDE ..... 5-11
5.3.2 PARTICULATE MATTER ..... 5-12
5.3.3 NITROGEN OXIDES ..... 5-13
5.3.4 SULFURIC ACID MIST ..... 5-22
5.3.5 LEAD ..... 5-23
5.3.6 RACT ANALYSIS FOR VOC ..... 5-23
6.0 AIR QUALITY IMPACT ANALYSIS METHODOLOGY ..... 6-1
6.1 GENERAL APPROACH ..... 6-1
6.2 SIGNIFICANT IMPACT ANALYSIS ..... 6-3
6.3 AAQS AND PSD CLASS II ANALYSES ..... 6-3
6.4 PSD CLASS I ANALYSIS ..... 6-4
6.5 MODEL SELECTION ..... 6-4
6.6 METEOROLOGICAL DATA ..... 6-5
6.7 EMISSION INVENTORY ..... 6-5
6.7.1 SIGNIFICANT IMPACT ANALYSIS ..... 6-5
6.7.2 AAQS AND PSD CLASS II ANALYSES ..... 6-6
6.7.3 CLASS I AREA ..... 6-8
6.8 RECEPTOR LOCATIONS ..... 6-9
6.8.1 SITE VICINITY ..... 6-9
6.8.2 CLASS I AREA ..... 6-10
6.9 BACKGROUND CONCENTRATIONS ..... 6-10
6.10 BUILDING DOWNWASH EFFECTS ..... 6-10
7.0 AIR QUALITY IMPACT ANALYSIS RESULTS ..... 7-1
7.1 PROPOSED PBPC PROJECT ..... 7-1
7.1.1 CLASS II AREA SIGNIFICANT IMPACT ANALYSIS ..... 7-1
7.1.2 AAQS ANALYSIS ..... 7-1
7.1.3 PSD CLASS II ANALYSIS ..... 7-2
7.1.4 PSD CLASS I ANALYSIS ..... 7-2

## TABLE OF CONTENTS


7.1.5 FLUORIDE IMPACTS ..... 7-2
7.1.6 SAM IMPACTS ..... 7-2
7.1.7 LEAD IMPACTS ..... 7-3
7.2 SIMULTANEOUS OPERATIONS ..... 7-3
7.2.1 AAQS ANALYSIS ..... 7-3
7.2.2 PSD CLASS II ANALYSIS ..... 7-4
7.2.3 PSD CLASS I ANALYSIS ..... 7-5
7.2.4 FLUORIDE IMPACTS ..... 7-5
7.2.5 SAM IMPACTS ..... 7-6
7.2.6 LEAD IMPACTS ..... 7-6
8.0 ADDITIONAL IMPACT ANALYSIS ..... 8-1
8.1 VICINITY OF PALM BEACH POWER CORP. ..... 8-1
8.1.1 VEGETATION AND SOILS ..... 8-1
8.1.2 VISIBILITY ..... 8-1
8.1.3 IMPACTS DUE TO ASSOCIATED GROWTH ..... 8-2
8.2 PSD CLASS I AREA ..... 8-2
8.2.1 IMPACTS TO SOILS ..... 8-3
8.2.2 IMPACTS TO VEGETATION ..... 8-4
8.2.3 IMPACTS TO WILDLIFE ..... 8-8
8.2.4 IMPACTS ON VISIBILITY ..... 8-9
8.2.5 SULFUR AND NITROGEN DEPOSITION ..... 8-13


LIST OF APPENDICES


APPENDIX A FACILITY DESIGN DATA
APPENDIX B FUEL INSPECTION PLAN, PALM BEACH POWER CORP.
APPENDIX C BASIS OF FUGITIVE EMISSIONS FROM PBPC MATERIAL HANDLING SYSTEM
APPENDIX D BASIS OF ACTUAL EMISSIONS FOR OSCEOLA FARMS BOILERS
APPENDIX E BACT COST ESTIMATES
APPENDIX F AAQS AND PSD EMISSION INVENTORIES
APPENDIX G CALPUFF MODEL DESCRIPTION AND METHODOLOGY
APPENDIX H BPIP INPUT/OUTPUT AND SAMPLE ISCST3 AND CALPUFF INPUT FILES

# TABLE OF CONTENTS

LIST OF TABLES

1-1 PSD Source Applicability Analysis, Palm Beach Power Corp. ..... 1-4

2-1 Maximum Fuel Usage and Heat Input Rates per Cogeneration Boiler, Palm Beach Power Corp. ..... 2-20

2-2 Stack Parameters for Project Sources, Palm Beach Power Corp. ..... 2-21

2-3 Federal NSPS for Electric Utility Steam-Generating Units Applicable to the Palm Beach Power Cogeneration Boilers ..... 2-22

2-4 Maximum Short-Term Emissions for Palm Beach Power Corp. (per cogeneration boiler) ..... 2-23

2-5 Maximum Annual Emissions Per Cogeneration Boiler for Palm Beach Power Corp. ..... 2-24

2-6 Future Maximum Emissions from the Package Boiler, Palm Beach Power Corp. ..... 2-25

2-7 Palm Beach Power Corp. Facility Maximum Annual Fugitive Dust Emissions ..... 2-26

3-1 National and State AAQS, Allowable PSD Increments, and Significant Impact Levels ($\mu g/m^3$) ..... 3-14

3-2 PSD Significant Emission Rates and *De Minimis* Monitoring Concentrations ..... 3-15

3-3 PSD Source Applicability Analysis, Palm Beach Power Corp. ..... 3-16

3-4 Increase in Impacts Due to Proposed Project Compared to Class II Significant Impact Levels and Ambient Monitoring *De Minimis* Levels ..... 3-17

4-1 Summary of Continuous Sulfur Dioxide Ambient Monitoring Data Collected Near the PBPC Site ..... 4-5

4-2 Summary of Continuous Ambient Carbon Monoxide Monitoring Data Collected Near the PBPC Site ..... 4-6

4-3 Summary of $PM_{10}$ Ambient Monitoring Data Collected Near the PBPC Site ..... 4-7

4-4 Summary of Continuous Ambient Nitrogen Dioxide Data Collected Near the PBPC Site ..... 4-8

4-5 Summary of Sulfur Dioxide, $PM_{10}$, and $NO_x$ Monitoring Data Collected in or Near the Everglades National Park ..... 4-9

5-1 Summary of BACT Determinations for Sulfur Dioxide from Biomass-Fired Boilers ..... 5-24

5-2 Summary of BACT Determinations for Nitrogen Oxide Emissions from Biomass-Fired Boilers ..... 5-25

5-3 Summary of BACT Determinations for Fluorides Emissions from Biomass-Fired Boilers ..... 5-26

5-4 Summary of BACT Determinations for Sulfuric Acid Mist Emissions from Biomass-Fired Boilers ..... 5-27

5-5 Summary of BACT Determinations for Lead Emissions from Biomass-Fired Boilers ..... 5-28

# TABLE OF CONTENTS

LIST OF TABLES - continued

5-6 BACT Determinations for $SO_2$ Emissions for Fuel Oil-Fired Industrial Boilers, 100 MMBtu/hr or Greater ....5-29

5-7 BACT Determinations for $SO_2$ Emissions for Natural Gas-Fired Industrial Boilers, 100 MMBtu/hr or Greater ....5-30

5-8 BACT Determinations for $PM/PM_{10}$ Emissions for Fuel Oil-Fired Industrial Boilers, 100 MMBtu or Greater ....5-31

5-9 BACT Determinations for $PM/PM_{10}$ Emissions for Natural Gas-Fired Industrial Boilers, 100 MMBtu/hr or Greater ....5-32

5-10 BACT Determinations for $NO_x$ Emissions for Fuel Oil-Fired Industrial Boilers, 100 MMBtu or Greater ....5-33

5-11 BACT Determinations for $NO_x$ Emissions for Natural Gas-Fired Industrial Boilers, 100 MMBtu/hr or Greater ....5-34

5-12 BACT "Top-down" Hierarchy of $NO_x$ Reduction Methods for the Proposed Package Boiler, PBPC ....5-35

5-13 Cost Effectiveness of SCR, PBPC Package Boiler ....5-36

5-14 Cost Effectiveness of SNCR, PBPC Package Boiler ....5-37

5-15 Summary of Top-Down BACT Impact Analysis Results for $NO_x$ ....5-38

6-1 Major Features of the ISCST3 Model ....6-12

6-2 Major Features of the CALPUFF Model, Version 5.4 ....6-13

6-3 Summary of Current Actual and Future Potential Emission Rates for Project-Affected Sources Used in the Significant Impact Analysis, Palm Beach Power Corp. ....6-14

6-4 Summary of Osceola Farms Company Stack Parameters Used in the Significant Impact Modeling Analysis ....6-15

6-5 Summary of $SO_2$ Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analyses ....6-16

6-6 Maximum $SO_2$ Emissions for Osceola Farms Used in the Simultaneous Operations Modeling Analysis ....6-17

6-7 Maximum $NO_x$ and CO Emissions for Osceola Farms Used in the Simultaneous Operations Modeling Analysis ....6-18

6-8 Maximum $PM_{10}$ Emissions for Osceola Farms Used in the Simultaneous Operations Modeling Analysis ....6-19

6-9 Maximum Emissions for Palm Beach Power Boilers Used in the Simultaneous Operations Modeling Analysis ....6-20

6-10 Summary of $NO_x$ Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analysis for Simultaneous Operations ....6-21

## TABLE OF CONTENTS

LIST OF TABLES - continued

6-11 Summary of PM Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analysis for Simultaneous Operations ..... 6-23

6-12 Summary of CO Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analysis for Simultaneous Operations ..... 6-24

6-13 Summary of $SO_2$ Facilities Included in the PSD Class I Air Modeling Analysis for Simultaneous Operations ..... 6-25

6-14 Summary of $PM_{10}$ Emission Rates Used in the Regional Haze Modeling Analysis, Palm Beach Power Corp. ..... 6-26

6-15 Palm Beach Power Corp. Property Boundary Receptors Used in the Modeling Analysis ..... 6-27

6-16 Everglades National Park Receptors Used in the PSD Class I Modeling Analysis ..... 6-28

6-17 Palm Beach Power Corp. and Osceola Farms Building Dimensions Used in the Modeling Analysis ..... 6-29

7-1 Maximum Predicted Impacts Due to the Proposed Project Only, Palm Beach Power Corp. ..... 7-7

7-2 Maximum Predicted $SO_2$ Impacts For All Sources, AAQS Screening Analysis, Palm Beach Power Corp ..... 7-8

7-3 Maximum Predicted $SO_2$ Concentrations for All Sources Compared to the AAQS - Refined Analysis, Palm Beach Power Corp ..... 7-9

7-4 Maximum Predicted $SO_2$ Impacts For All Sources, PSD Class II Screening Analysis, Palm Beach Power Corp ..... 7-10

7-5 Maximum Predicted $SO_2$ Concentrations for All Sources Compared to the PSD Class II Increment Refined Analysis, Palm Beach Power Corp ..... 7-11

7-6 Summary of Maximum Pollutant Concentrations Predicted for the Project Only Compared to the EPA Class I Significant Impact Levels and PSD Class I Increments ..... 7-12

7-7 Maximum Predicted Increase in Fluoride Impacts Due to the Proposed Project at the Site Vicinity ..... 7-13

7-8 Maximum Predicted Increase in Sulfuric Acid Mist Impacts Due to the Proposed Project at the Site Vicinity ..... 7-14

7-9 Maximum Predicted Increase in Lead Impacts Due to the Proposed Project at the Site Vicinity ..... 7-15

7-10 Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation AAQS Screening Analyses, Crop Season Only ..... 7-16

7-11 Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation AAQS Refined Analyses, Crop Season Only ..... 7-18

## TABLE OF CONTENTS

LIST OF TABLES - continued

7-12 Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation PSD Class II Increment Screening Analyses, Crop Season Only ..... 7-19

7-13 Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation PSD Class II Increment Refined Analyses, Crop Season Only ..... 7-20

7-14 Summary of Maximum Pollutant Concentrations Predicted for the Simultaneous Operations Compared to the EPA Class I Significant Impact Levels and PSD Class I Increments ..... 7-21

7-15 Maximum 3-Hour and 24-Hour Average $SO_2$ PSD Increments Predicted for Simultaneous Operation at the Everglades National Park ..... 7-22

7-16 Maximum Predicted Increase in Fluoride Impacts Due to the Simultaneous Operations at the Site Vicinity ..... 7-23

7-17 Maximum Predicted Increase in Sulfuric Acid Mist Impacts Due to the Simultaneous Operations at the Site Vicinity ..... 7-24

7-18 Maximum Predicted Increase in Lead Impacts Due to the Simultaneous Operations at the Site Vicinity ..... 7-25

8-1 Maximum Predicted Concentrations Due to the Project Only at the Class I Area of the Everglades National Park ..... 8-14

8-2 Maximum Predicted Concentrations Due to Simultaneous Operations at the Class I Area of the Everglades National Park ..... 8-15

8-3 $SO_2$ Effects Levels for Various Plant Species ..... 8-16

8-4 Sensitivity Groupings of Vegetation Based on Visible Injury at Different $SO_2$ Exposures ..... 8-17

8-5 Fluoride Effect Levels for Various Plant Species ..... 8-18

8-6 Examples of Reported Effects of Air Pollutants on Animals at Concentrations Below National Secondary Ambient Air Quality Standards ..... 8-19

8-7 Maximum Sulfur and Nitrogen Deposition Predicted for the Project at the Everglades National Park PSD Class I Area ..... 8-20

8-8 Maximum Sulfur and Nitrogen Deposition Predicted for the Simultaneous Operation at the Everglades National Park PSD Class I Area ..... 8-21

# TABLE OF CONTENTS

LIST OF FIGURES

1-1a Photos of Osceola Power Corp. Cogeneration Facility ..... 1-5

1-1b Photos of Osceola Power Corp. Cogeneration Facility ..... 1-6

2-1 Location of Palm Beach Power Corp. ..... 2-27

2-2 Simplified Flow Diagram, Palm Beach Power Corp. ..... 2-28

2-3 Package Boiler, Palm Beach Power Corp ..... 2-29

2-4 Palm Beach Power Material Handling System ..... 2-30

2-5 Facility Plot Plan- Palm Beach Power Corp ..... 2-31

2-6 Osceola Farms Sugar Mill Plot Plant ..... 2-32

2-7 Expanded Plot Plan of Proposed Cogeneration Facility, Palm Beach Power Corp ..... 2-33

6-1 Palm Beach Power Corp. Property Boundary and Off-Property Receptors Used in the Modeling Analysis ..... 6-30

6-2 Palm Beach Power Corp. and Osceola Farms Building and Stack Locations ..... 6-31

8-1 Annual Frequency of 24-Hour Visibility Impairment at the Everglades National Park Due to the Simultaneous Operation at Palm Beach Power Corp ..... 8-22

# TABLE OF CONTENTS

## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| AAQS | Ambient Air Quality Standard |
| acfm | actual cubic feet per minute |
| AIRS | Aerometric Information Retrieval System |
| AOC | area of concern |
| API | American Petroleum Institute |
| ASTM | American Society for Testing and Materials |
| BACT | best available control technology |
| Btu | British thermal unit |
| BTEX | benzene, toluene, ethylbenzene, and xylene |
| CAA | Clean Air Act |
| CE | carbon equivalent |
| CEM | continuous emission monitoring |
| CFR | Code of Federal Regulations |
| $CH_4$ | methane |
| CMS | Corrective Measures Study |
| CO | carbon monoxide |
| $CO_2$ | carbon dioxide |
| COC | constituent of concern |
| COPC | constituent of potential concern |
| DE | diatomaceous earth |
| DEP | Department of Environmental Protection |
| DOE | Department of Energy |
| dscfm | dry standard cubic feet per minute |
| FAA | Federal Aviation Administration |
| EPA | U.S. Environmental Protection Agency |
| F.A.C. | Florida Administrative Code |
| FDER | Florida Department of Environmental Regulation |
| FDEP | Florida Department of Environmental Protection |
| FDOT | Florida Department of Transportation |
| ft | foot |

## TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS - continued

| | |
|---|---|
| ft-bls | feet below land surface |
| ft/day | feet per day |
| ft-msl | feet above mean sea level |
| ft/year | feet per year |
| FWS | Florida Weather Service |
| GEP | Good Engineering Practice |
| Golder | Golder Associates Inc. |
| gpm | gallon per minute |
| gr/dscf | grains per dry standard cubic foot |
| GWP | global warming potential |
| $H_2S$ | hydrogen sulfide |
| HAP | hazardous air pollutant |
| HHV | high heating value |
| HI | Hazard Index |
| HSH | highest, second-highest |
| HSWA | Hazardous and Solid Waste Amendments Act |
| i | hydraulic gradient |
| K | hydraulic conductivity (centimeters/second) |
| km | kilometer |
| kPa | kiloPascal |
| kV | kilovolt |
| lb/dscf | pounds per dry standard cubic foot |
| LCA | Life-cycle Analysis |
| LDN | liquefied natural gas |
| LEL | lower explosive limit |
| LHV | lower heating value |
| $m^3$ | cubic meter |
| MACT | maximum available control technology |
| MCL | maximum contaminant level |
| mg/kg | milligrams per kilogram |

## TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS - continued

| | |
|---|---|
| mg/L | milligrams per liter |
| mmBtu | million British thermal units |
| mph | miles per hour |
| MW | megawatt |
| MW | monitor well |
| n | effective porosity |
| NESHAP | National Emission Standard for Hazardous Air Pollutant |
| NET | National Emission Trends |
| $N_2O$ | nitrous oxide |
| $NO_2$ | nitrogen dioxide |
| $NO_x$ | nitrogen oxide |
| NOAA | National Oceanic and Atmospheric Administration |
| NPDES | National Pollutant Discharge Elimination System |
| NPS | National Park Service |
| NSPS | New Source Performance Standards |
| NSR | new source review |
| NWS | National Weather Service |
| $O_3$ | ozone |
| PBS&J | Post, Buckley, Schuh and Jurnigan |
| PCB | polychlorinated biphenyl |
| PM | particulate matter |
| $PM_{10}$ | particulate matter less than 10 microns |
| ppm | parts per million |
| ppmvd | parts per million volume dry |
| PRG | Preliminary Remedial Goals |
| PR/VSI | Preliminary Review and Visual Site Inspection |
| PSD | prevention of significant deterioration |
| psi | pounds per square inch |
| q | Darcy velocity (ft/day) |
| RACT | Reasonably Available Control Technology |

## TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS - continued

| | |
|---|---|
| RCRA | Resource Conservation and Recovery Act |
| RFA | RCRA Facility Assessment |
| RFI | RCRA Facility Investigation |
| RTO | regenerative thermal oxidizer |
| scfh | standard cubic foot per hour |
| SCS | Soil Conservation Service |
| SIP | Florida's State Implementation Plan |
| $SO_2$ | sulfur dioxide |
| SU | standard unit |
| SVOC | semi-volatile organic compounds |
| SWFWMD | Southwest Florida Water Management District |
| SWMU | solid waste management unit |
| TAL | total analyte list |
| TCLP | Toxicity Characteristic Leaching Procedure |
| THI | Temperature-Humidity Index |
| TPH | tons per hour |
| TPY | tons per year |
| TSP | total suspended particulate matter |
| TTN | Technology Transfer Network |
| µg/L | micrograms per liter |
| $\mu g/m^3$ | micrograms per cubic meter |
| USC | United States Code |
| USDA | United States Department of Agriculture |
| USFWS | U.S. Fish and Wildlife Service |
| VDM | visually discernable material |
| VOC | volatile organic compound |
| WAR | Water & Air Research |

## TABLE OF CONTENTS

REFERENCES

Ashenden, T.W. and I.A.D. Williams. 1980. Growth Reductions on *Lolium multiflorum* Lam. and *Phleum pratense* L. as a Result of $SO_2$ and $NO_2$ pollution. Environ. Pollut. Ser. A. 21:131-139.

Carlson, R.W. 1979. Reduction in the Photosynthetic Rate of *Acer quercus* and *Fraxinus* Species Caused by Sulphur Dioxide and Ozone. Environ. Pollut. 18:159-170.

Coen Company, Inc. 1991. Introduction to Coen Low-$NO_x$ Burner Technologies.

Engelhard Corporation. 1991. Catalyst Technology for Cleaner Air.

Florida Department of Environmental Protection. 1995. Florida Air Toxics Working List (Version 4.0).

Gough, L.P., Shacklette, H.T., and A.A. Case. 1979. Element concentrations toxic to plants, animals, and man. U.S. Geological Survey Bulletin 1466. U.S. Government Printing Office, Washington, DC.

Hart, R., P.G. Webb, R.H. Biggs, and K.M. Portier. 1988. The Use of Lichen Fumigation Studies to Evaluate the Effects of New Emission Sources on Class I Areas. J. Air Poll. Cont. Assoc. 38:144-147.

Heck, W.W. and D.T. Tingey. 1979. Nitrogen Dioxide: Time-Concentration Model to Predict Acute Foliar Injury. EPA-600/3-79-057, U.S. Environmental Protection Agency, Corvallis, OR.

Horsman, D.C. and Wellburn, A.R.. 1976. Guide to Metabolic and Biochemical Effects of Air Pollutants in Higher Plants (Appendix II). Editor T.A. Mansfield. Cambridge University Press, Cambridge, England.

Johnson, A. and Lockert, C. 2002. Cost-Competitive $NO_x$ compliance for Coal-Fired Boilers

Johnson-Matthey Catalyst Systems Division. 1990. Standard Technical Sales Literature.

Malhotra, S.S. and A.A. Kahn. 1978. Effect of Sulfur Dioxide Fumigation on Lipid Biosynthesis in Pine Needles. Phytochemistry 17:241-244.

Matsumaru, T., T. Yoneyama, T. Totsuka, and K. Shiratori. 1979. Absorption of Atmospheric $NO_2$ by Plants and Soils. Soil Sci. Plant Nutr. 25:255-265.

McLaughlin, S.B. and N.T. Lee. 1974. Botanical Studies in the Vicinity of the Widows Creek Steam Plant. Review of Air Pollution Effects Studies, 1952-1972, and Results of 1973 Surveys. Internal Report I-EB-74-1, TVA.

## TABLE OF CONTENTS

REFERENCES - continued

Newman, J.R. 1981. Effects of Air Pollution on Animals at Concentrations at or Below Ambient Air Standards. Performed for Denver Air Quality Office, National Park Service, U.S. Department of the Interior. Denver, Colorado.

Newman, 1975. Fluoride Standards Predicting Wildlife Effects, Fluoride 17:41-47.

Newman, J.R. and R.K. Schreiber. 1988. Air Pollution and Wildlife Toxicology. Environmental Toxicology and Chemistry. 7:381-390.

Pollok, M., U. Hever, and M.S. Naik. 1989. Inhibition of stomatal opening in sunflower leaves by carbon monoxide and reversal of inhibition by light. Planta 178:223-230.

Treshow and Anderson, 1989. Plant Stress from Air Pollution. John Wiley and Sons. New York.

Woltz, S.S. and T.K. Howe. 1981. Effects of Coal Burning Emissions on Florida Agriculture. In: The Impact of Increased Coal Use in Florida. Interdisciplinary Center for Aeronomy and (other) Atmospheric Sciences. University of Florida, Gainesville, Florida.

Zahn, R. 1975. Gassing Experiments with $NO_2$ in Small Greenhouses. Staub Reinhalt. Luft 35:194-196.

# 1.0 SUMMARY

Palm Beach Power Corp. (PBPC) is currently the owner of the Osceola cogeneration facility. This cogeneration facility was previously owned by Osceola Power Limited Partnership. The Osceola Cogeneration facility originally received a prevention of significant deterioration (PSD) permit from the Florida Department of Environmental Protection (FDEP) (Permit No. AC50-219795/PSD-FL-197) in 1993. As a condition of this PSD permit, the Osceola Farms sugar mill boilers, located adjacent to the Osceola cogeneration facility, were to be shutdown after startup and debugging of the cogeneration facility.

The Osceola Cogeneration facility was constructed and began operating in 1996. However, due to a number of factors, the facility was shutdown in 1997 and has not operated since that time. Photographs of the Osceola Cogeneration facility, taken just prior to operation in 1996, are presented in Figure 1-1.

The Osceola Cogeneration facility's current permit (Permit No. 0990331-008-AC/PSD-FL-197G) requires that the Osceola Farms sugar mill boilers be permanently shutdown or that the PSD permit for the Osceola cogeneration facility be surrendered by August 1, 2002. The current owners of the facility have elected to surrender the existing air permit for the cogeneration facility and to apply for a new PSD permit. If an acceptable new PSD permit is issued for the cogeneration facility, the existing sugar mill boilers will be shutdown and rendered incapable of operation after startup and debugging of the cogeneration facility. These shutdowns will provide contemporaneous emissions offsets under the PSD new source review program.

The PBPC facility will be located adjacent to the Osceola Farms sugar mill, which is located east of Pahokee in Palm Beach County, Florida. The PBPC facility will combust primarily biomass (bagasse and wood) in two identical steam boilers to generate steam and electricity. A package boiler that combusts natural gas or Number (No.) 2 fuel oil will also be installed to generate steam, primarily as backup to the cogeneration boilers. The cogeneration facility will supply the adjacent Osceola Farms sugar mill with process steam during the sugar cane grinding season, approximately October through March. Electricity will be sold through Florida's electrical transmission grid.

Most of the equipment now laying idle at the Osceola cogeneration facility will remain in place and be used by the PBPC. The cogeneration facility and the sugar mill will be considered a single facility for PSD purposes.

Each of the two cogeneration boilers will produce up to 506,000 pounds per hour (lb/hr) steam (24-hour average) for a maximum of 8,760 hours per year (hr/yr). The total annual heat input to the boilers will be 13.32 x $10^{12}$ British thermal units per year (Btu/yr).

The package boiler will produce up to 150,000 lb/hr steam for a maximum of 8,760 hr/yr. The maximum heat input rate to the package boiler will be 211 million British thermal units per hour (MMBtu/hr) for natural gas and 202 MMBtu/hr for No. 2 fuel oil.

Based on the potential increase in emissions of sulfur dioxide ($SO_2$), nitrogen oxides ($NO_x$), lead (Pb), fluorides, and sulfuric acid mist (SAM), the proposed PBPC cogeneration facility will constitute a major modification to an existing major source (i.e., the sugar mill), and thus trigger new source review under the provisions of the PSD regulations for these pollutants. The net change in emissions of regulated air pollutants is shown in Table 1-1. Note that the project will result in large decreases in emissions of particulate matter (PM), PM with an aerodynamic diameter of 10 microns or less ($PM_{10}$), carbon monoxide (CO), and volatile organic compound (VOC).

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;
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 (impact on soils, vegetation, and visibility), including impacts on PSD Class I areas.

This PSD permit application addresses these requirements and is organized into six additional sections, followed by the appendices. A complete description of the project including air emission sources and pollution control equipment is presented in Section 2.0. The regulatory applicability

analysis of the proposed project is presented in Section 3.0. The 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 methodology and impact analysis results are presented in Sections 6.0 and 7.0, respectively. The additional impact analysis is presented in Section 8.0. Supporting documentation is presented in the appendices.

Table 1-1. PSD Source Applicability Analysis, Palm Beach Power Corp.

| Regulated Pollutant | Current Actual Emissions From Osceola Farms (TPY) | PBPC Future Potential Emissions (TPY) | Net Change In Emissions Due to Proposed Project (TPY) | PSD Significant Emission Rate (TPY) | PSD Review Triggered? |
|---|---|---|---|---|---|
| Particulate (TSP) | 301.43 | 235.82 | -65.61 | 25 | No |
| Particulate ($PM_{10}$) | 256.30 | 230.58 | -25.72 | 15 | No |
| Sulfur Dioxide | 168.66 | 450.55 | 281.89 | 40 | **Yes** |
| Nitrogen Oxides | 299.19 | 1,104.87 | 805.68 | 40 | **Yes** |
| Carbon Monoxide | 7,569.92 | 2,427.62 | -5,142.30 | 100 | No |
| VOC | 510.90 | 427.21 | -83.69 | 40 | No |
| Mercury | 0.015 | 0.039 | 0.02 | 0.1 | No |
| Fluorides | 0.810 | 4.66 | 3.85 | 3 | **Yes** |
| Lead | 0.047 | 1.01 | 0.96 | 0.6 | **Yes** |
| Sulfuric Acid Mist | 10.328 | 26.74 | 16.41 | 7 | **Yes** |

Note: $PM_{10}$ = Particulate Matter with aerodynamic diameter less than or equal to 10 microns.
TSP = Total Suspended Particles.
VOC = Volatile Organic Compound.

Photo #1. Power Block (closeup)

Photo #2. Power Block

Figure 1-1a
Photos of Palm Beach Power Corp. Cogeneration Facility

Golder Associates

Source: Golder. 2002.

Photo #3. Biomass Truck Dump System

Photo #4. Biomass Conveying System

Figure 1-1b
Photos of Palm Beach Power Corp. Cogeneration Facility

Source: Golder, 2002.

# 2.0 PROJECT DESCRIPTION

## 2.1 GENERAL

PBPC is currently the owner of the Osceola cogeneration facility. The facility was previously owned by Osceola Power Limited Partnership. The facility is located adjacent to the Osceola Farms sugar mill, which is east of Pahokee in Palm Beach County, Florida. The original construction permit for the cogeneration facility was issued to Osceola Power on September 27, 1993 (Permit No. AC50-219795/PSD-FL-197). As a condition of this permit, the Osceola Farms sugar mill boilers were to be shutdown after startup and debugging of the cogeneration facility.

The Osceola cogeneration facility was constructed and began operating in 1996. Initial performance testing was conducted in early 1997. Due to a number of factors, however, the facility only operated for a short period and was shutdown in 1997. The facility has not operated since that time, and currently sits idle.

The original air construction permit for the Osceola Power facility was modified several times. The latest amendment was permit No. 0990331-008-AC/PSD-FL-197G, issued October 18, 2000. This permit modification extended operation of the existing sugar mill boilers to provide additional time to restart, test, and complete the fuel and steam interconnections between the cogeneration plant and the sugar mill. The permit also requires that the Osceola Farms sugar mill boilers be permanently shutdown or that the PSD permit for the Osceola cogeneration facility be surrendered by August 1, 2002.

The current owners of the facility, PBPC, have elected to surrender the existing air permit for the cogeneration facility and to apply for a new PSD permit. If an acceptable new PSD permit is issued for the cogeneration facility, the existing sugar mill boilers will be shutdown and rendered incapable of operation once the cogeneration facility completes startup and debugging. These shutdowns will provide contemporaneous emissions offsets under the PSD new source review program.

The PBPC facility will be located adjacent to the Osceola Farms sugar mill. The facility will combust primarily biomass (bagasse and wood) in two identical steam boilers to generate steam and electricity. A package boiler that combusts natural gas and No. 2 fuel oil will be installed to generate steam, primarily as backup for the cogeneration boilers. The cogeneration facility will supply the adjacent Osceola Farms sugar mill with process steam during the sugar cane grinding season,

approximately October through March. Electricity will be sold through Florida's electrical transmission grid.

Most of the equipment now laying idle at the Osceola cogeneration facility will remain in place and be used by PBPC. The PBPC cogeneration facility and the Osceola Farms sugar mill will be considered a single facility for PSD purposes.

A regional map showing the location of the PBPC site is presented in Figure 2-1.

## 2.2 FACILITY DESCRIPTION

The PBPC facility will be designed to produce electricity for internal use and for sale to the electric power grid. A facility flow diagram is presented in Figure 2-2. The major components of the facility are the two cogeneration boilers and associated air pollution control equipment and stacks, a package boiler, a steam turbine and condenser, an electrical generator, a cooling tower, ash silo, and the fuel handling system. This section presents a description of the facility as it pertains to the air permitting process.

### 2.2.1 COGENERATION BOILERS

The PBPC facility will operate with two main steam boilers burning biomass (bagasse and wood materials), No. 2 fuel oil and natural gas. The boilers will be ABB Combustion Engineering Systems Model VU-40 units. Design features of the boilers include the following:

- ABB Model VU-40 steam generator
- Two-drum, field erected, open pass, balanced draft steam generators
- Water cooled furnace with electrical resistance welded steel boiler tubes
- Superheater section
- Economizer section
- Primary and overfire air systems
- Primary air preheater
- Overfire air preheater
- Plenum hoppers, boiler hoppers and air heater hoppers for collection of fly ash
- Forced draft and induced draft fans
- Primary and overfire air systems

- Peabody Model DFL-870, No. 2 fuel oil burners (4); steam atomizing; 150 MMBtu/hr heat input maximum each burner
- Coen (or equivalent) natural gas burners (4), rated at 150 MMBtu/hr each
- Spreader stoker, with continuous front ash discharge, vibrating grate, water cooling, grate area of 624 square feet ($ft^2$)

Design data for each boiler are as follows:

Furnace volume = 40,700 cubic feet ($ft^3$)

Steam temperature = 955°Fahrenheit (F)

Steam pressure = 1,755 pounds per square inch gauge (psig) (design); 1,540 psig (operating)

Maximum steam output = 506,000 lb/hr (24-hour average)

Maximum heat input = $760 \times 10^6$ Btu/hr (biomass)

= $600 \times 10^6$ Btu/hr (No. 2 fuel oil or natural gas)

The boilers are balanced draft boilers and will operate under a slight negative pressure (about 0.1 inch $H_2O$). A balanced draft furnace prevents leakage of flue gas out of the unit. Any air movement through the boiler walls will be in the form of air in-leakage.

The boilers are designed for a pressure of 1,755 psig. The actual operating pressure will be approximately 1,540 psig with a steam temperature of approximately 955°F. Maximum steam production for each boiler will be 506,000 lb/hr (24-hour average). A general arrangement view of the boilers is provided in Appendix A.

The PBPC cogeneration facility will be designed to provide the Osceola Farms sugar mill with approximately 300,000 lb/hr of steam at 250 to 350 psig and 550°F and approximately 300,000 lb/hr of steam at 22 psig and 280°F during the crop season (generally October through March). These steaming rates may vary as a function of operational conditions; equipment and process efficiencies; characteristics of the fuel, which is an agricultural product and somewhat variable; and overall sugar mill production rate. The process steam conditions will normally be controlled within a ±10 percent range. During normal operating conditions, the process steam flow can be expected to fluctuate within a ±25 percent range. During startup, shutdown, upset, or transient conditions, steam flow could diminish to zero.

The maximum heat input to each of the two boilers will be 760 (MMBtu/hr) when firing 100-percent biomass, and 600 MMBtu/hr when firing 100-percent No. 2 fuel oil or natural gas. The maximum annual heat input to the entire facility will be $13.32 \times 10^{12}$ Btu/yr, based on 8,760 hr/yr operation of both boilers.

Biomass will be burned on a vibrating grate located within each boiler. In this design, fuel combusts in suspension above the grate or on the grate surface. Both underfire and overfire air are supplied to enhance combustion efficiency. Ash is removed from the grate by periodically vibrating the grate.

### 2.2.2 PACKAGE BOILER

The PBPC facility will operate with a steam package boiler capable of burning either natural gas or No. 2 fuel oil. The maximum heat input will be 211 MMBtu/hr for natural gas and 202 MMBtu/hr for No. 2 fuel oil. The package boiler will operate as needed to support the PBPC facility operations, but will be permitted to operate up to 8,760 hr/yr. A flow diagram of the package boiler is presented in Figure 2-3.

The package boiler will be designed to provide the PBPC facility with 150,000 lb/hr of steam at 400 psig and 650°F.

### 2.2.3 FUELS

Fuels combusted in the boilers will consist of biomass, i.e., bagasse and wood, natural gas, and No. 2 fuel oil. Bagasse fuel will be generated from the Osceola Farms sugar mill and conveyed directly to the PBPC facility. Wood materials will be procured from suppliers in the area. These will generally be the same suppliers currently supplying the New Hope Power Partnership/Okeelanta cogeneration facility with wood fuel. Wood materials could include clean construction and demolition wood debris, yard trimmings, land clearing debris, and other clean cellulose and vegetative matter.

Since the wood fuel obtained by PBPC will come from a number of sources, the possibility of trace contaminants (painted wood, treated wood, plastics, metals, etc.) in the fuel stream exists. In order to minimize the possibility of contaminants entering into the fuel stream to be combusted, PBPC will implement a fuel inspection program. The fuel inspection plan is presented in Appendix B.

PBPC will generally combust approximately a 50/50 mixture of bagasse and wood. From operating experience at the Okeelanta cogeneration facility, this fuel mix is advantageous to the combustion process. As a result, PBPC will stockpile some bagasse during the sugar cane harvesting season, in order to combust it in the off-season.

Because wood materials are not commodity fuels and the supply of wood may fluctuate, it is necessary to have the ability to burn limited amounts of fossil fuel in the event that the supply of biomass fuel is not adequate. Therefore, each cogeneration boiler will have the capability to burn biomass, very low sulfur No. 2 fuel oil (maximum sulfur content of 0.05 percent), and natural gas, either alone or in combination. Fuel oil and natural gas will typically be burned in the cogeneration boilers on a limited basis for startup, shutdown, and as a supplemental fuel to enhance combustion and steam generation. However, they may also be utilized in the event of a biomass fuel shortage. Maximum utilization of fuel oil and natural gas combined will not exceed 25 percent on a calendar quarter basis, per cogeneration boiler.

The maximum fuel usage and heat input rates for each cogeneration boiler, including maximum short-term and annual averages for biomass, No. 2 fuel oil, and natural gas, are shown in Table 2-1. On an annual basis, all fuels may be fired alone or in combination, not to exceed a total heat input for each boiler of $6.658 \times 10^{12}$ Btu/yr ($13.32 \times 10^{12}$ Btu/yr for both boilers combined). These rates are based on maximum boiler operation for 8,760 hr/yr. As described previously, burning of No. 2 fuel oil/natural gas will be limited to a total of 25 percent of the total annual heat input per cogeneration boiler.

Three annual average cases are shown in Table 2-1 to illustrate the anticipated scenario of firing 100 percent biomass fuel and the potential cases of firing the maximum amount of fuel oil or the maximum amount of natural gas in the cogeneration boilers, with the remaining heat input due to biomass. When only biomass is fired, the annual heat input requirement is $6.658 \times 10^{12}$ Btu/yr for each cogeneration boiler. Under the case of fossil fuel combustion at 25 percent of the total annual heat input, the annual heat input requirement for each cogeneration boiler becomes $6.268 \times 10^{12}$ Btu/yr, due to the different heat transfer efficiency for No. 2 fuel oil and natural gas versus biomass.

The proposed package boiler will burn natual gas and very low sulfur No. 2 fuel oil (maximum sulfur content of 0.05 percent). The package boiler will be permitted at 8,760 hr/yr operation.

### 2.2.4 POLLUTION CONTROL EQUIPMENT

#### 2.2.4.1 Cogeneration Boilers

The PBPC cogeneration facility will utilize several emission control techniques to reduce emissions. A selective non-catalytic reduction (SNCR) system will be used to reduce $NO_x$ emissions from the cogeneration boilers. SNCR is a system that injects urea into the boiler to reduce $NO_x$ emissions. Particulate emissions from each cogeneration boiler will be controlled by a mechanical collector followed by an electrostatic precipitator (ESP). Further, the cogeneration boilers will minimize CO and VOC emissions through proper furnace design and good combustion practices. Design information for all of these control methods are provided below.

**Good Combustion Practices**

Good combustion practices for the cogeneration boilers will include control of combustion air and combustion temperature; distribution of fuel on the combustion grate; and controls over the furnace loads and transient conditions. An oxygen meter will be used to measure the oxygen content of the flue gases from each boiler. The oxygen monitor will be used with automatic feedback or manual controls to continuously optimize air/fuel ratio parameters. Depending on the fuel quality and existing combustion conditions, the operator will provide sufficient excess air to ensure good combustion within the boiler. Good combustion controls will also include the following:

- Maintain improved combustion controls to provide efficient tuning of air/fuel control instrumentation.
- Maintain effective water level controls in bottom ash system to prevent intrusion of ambient air.
- Mix biomass fuel to provide a consistent fuel blend.
- Maintain the flue gas oxygen content to provide efficient combustion for the existing conditions.
- When necessary to enhance poor combustion, reduce the biomass feed rate below the maximum rate.
- When necessary to enhance poor combustion, co-fire natural gas or distillate oil.

**$NO_x$ Control System**

A urea injection system manufactured by Nalco-Fueltech will be used for $NO_x$ control. The technology is a selective non-catalytic reduction process, which reduces $NO_x$ emissions through chemical reaction with urea. In the process, urea is injected into the flue gas stream and reacts with nitrogen oxides to form nitrogen and water vapor. The $NO_x$ control system will include the following major components:

- Carrier air compressors.
- Urea tank.
- Urea/air flow controls.
- Control panel.
- Injection manifolds and injectors.
- Valves and instrumentation.

A single urea storage tank system will supply urea to both boilers. Urea for injection into each boiler is drawn from the tank. Three injection zones will be used on each boiler to provide injection at full and part load conditions. The first zone will have four injectors, and the second and third zones will have six injectors each, for a total of sixteen injectors. A schematic of the injector configuration is presented in Appendix A. Zone switching valves will direct the urea/carrier mixture to the appropriate injection zone.

Specifications for the urea injection system to meet the proposed $NO_x$ emission rate of 0.15 pounds per million British thermal unit (lb/MMBtu) when firing biomass fuels, No. 2 oil or natural gas are provided below (on a per boiler basis):

Urea injection rate - 65 gallons per hour (gal/hr) (max)

Ammonia Slip - Biomass - 25 parts per million (ppm) (max)

- Oil and natural gas - 65 ppm (max)

**Mechanical Collectors**

The mechanical collectors for the boilers will be provided by Barron Industries (or equivalent). These are multi-tube collectors, identical to the mechanical collectors now installed at the Okeelanta cogeneration facility. Specifications for the dust collectors are provided below. Refer to Appendix A for further information.

Model: 460 Tube BASE III (or equivalent)

No. of modules: 4

No. of tubes: 460

Nominal collection tube size: 9 inches

Material: carbon steel

Pressure drop: 2.8 inches in water gauge (w.g.)

Expected collection efficiency: >80 percent

**Electrostatic Precipitator**

The ESPs for the PBPC facility were manufactured by Flakt, Inc. A drawing of the proposed ESP is provided in Appendix A. Design specifications for the ESP (one per boiler) are provided below:

Chambers = 1

Collecting Plate = 12.30 feet (ft) Length x 39.37 ft Height

Fields/Chamber = 3

Specific Collection Area = 200 $ft^2$/1,000 actual cubic feet per minute (acfm) (minimum)

Gas Velocity = <4 feet per second (ft/s)

Pressure Drop = less than 2.8 inches water ($H_2O$)

Operating Temperature = 350°F

Ash Handling = Trough hopper with screw conveyor

Particulate removal efficiency: >99.2 percent

### 2.2.4.2 Package Boiler

The emissions from the package boiler will be controlled by the use of low-$NO_x$ burners (LNB) and by burning very low sulfur No. 2 distillate fuel oil (i.e., 0.05-percent sulfur or less). These control methods will also minimize emissions of PM, CO, and VOC.

## 2.2.5 BIOMASS FUEL HANDLING SYSTEM

The biomass fuel handling system will be designed to feed reduced rates to the cogeneration boilers to match boiler demand/use rates. Biomass fuel can be delivered to the facility and boilers in several ways. A flow diagram of the biomass fuel handling system is presented in Figure 2-4.

Under normal conditions during the grinding season, bagasse from the sugar mill will be delivered directly to the boilers by a belt conveyor system. Overfeed from the system will be conveyed to the

biomass storage pile to be utilized during the sugar cane off-season. Wood fuel will normally be conveyed from the fuel storage area and mixed with the bagasse prior to entering the boiler. These conveyor belts will be enclosed, and the conveyor transfer points will be partially enclosed.

Throughout the year, wood fuel will be delivered to the facility by truck. Bagasse could also be delivered by truck. The trucks will discharge the material into a dump hopper. The truck dump hopper will be open, but all subsequent conveyor belts will be covered and transfer points will be partially enclosed. From the dump hoppers, the biomass fuel will be placed on a conveyor belt, pass through a screen and hogger, and then placed on another conveyor to the boiler building or to the biomass storage pile. If directed to the boilers, the material will be transferred from the conveyor belt to the fuel distribution conveyor and then to the boiler feeder bins.

If directed to the biomass storage pile, the biomass will be transferred to the radial stacker, and then discharged onto the storage pile. From the storage pile, the biomass will be moved by mobile equipment to the underpile reclaimer devices. Biomass from the reclaim system will be deposited on a conveyor and delivered to the boilers via the previously described system.

As described previously, all conveyors and conveyor transfer points (except those directly associated with the stacker/reclaimer, for which enclosure is operationally infeasible) shall be enclosed or partially enclosed to minimize fugitive PM emissions. Water will be applied to storage piles, handling equipment, unenclosed transfer points, etc., during dry periods as necessary to minimize visible emissions.

### 2.2.6 ASH HANDLING SYSTEM

Ash generated from the combustion process will consist of bottom ash, siftings ash, and fly ash. Bottom ash is ash which falls off the front of the grate onto a submerged conveyor. Siftings ash is ash which drops down through the grate to the bottom of the boiler. Fly ash is ash captured downstream of the boiler in the boiler bank hoppers, air preheater hoppers, mechanical collectors, and the ESP.

Bottom ash generated in the boilers will be handled wet via a submerged drag-chain conveyor. This ash will be discharged to a storage pile inside a partially enclosed building and then removed by frontend loader. The frontend loader will be used to the load ash into trucks for offsite disposal.

Bottom ash will be handled in a wet state and in a partial enclosure, and therefore particulate emissions will be minimal.

The siftings ash collected at the bottom of the boiler will be periodically removed from the boiler by manual means on an as needed basis. This ash will be loaded into trucks by frontend loader for subsequent offsite disposal.

The fly ash collected downstream of the boiler will be conveyed via enclosed drag-chain or screw type conveyors to an ash silo (one silo for the facility). As an alternative, the fly ash may be mixed with the bottom ash and sent to the ash storage building. The ash will be conditioned with water prior to loading into trucks for offsite disposal. The silo will have a silo bin vent filter to control particulate matter emissions. A schematic of this system is presented in Appendix A. The design flow rate for the filter is 2,500 acfm, with an air-to-cloth ratio of 4:1.

### 2.2.7 FUEL OIL STORAGE TANK

A fuel oil tank will store the distillate fuel oil. The fuel oil tank has a capacity of 50,000 gallons and is approximately 24 ft high with a 20-ft diameter. The tank is a fixed roof design.

### 2.2.8 STACK PARAMETERS

Stack parameters for the cogeneration facility are presented in Table 2-2. Each of the three boilers within the proposed facility will be served by separate stacks. The top of each cogeneration boiler stack will be 199 ft above ground. Each stack will be 8.0 ft in diameter. There will also be a vent stack associated with the fly ash silo. The proposed package boiler will have a stack 75 ft in height with a 5.0-ft diameter.

### 2.2.9 FACILITY PLOT PLAN

A plot plan of the PBPC cogeneration facility is presented in Figure 2-5. The plot plan shows stack locations and major structures. The major structure at the site is the boiler building. This building has a height of approximately 121 ft above ground.

A plot plan of the adjacent Osceola Farms sugar mill is presented in Figure 2-6. An overall plot plan showing both the proposed PBPC site layout and the Osceola Farms site layout is presented in

Figure 2-7. This layout was obtained from an aerial photograph encompassing the PBPC facility and the Osceola Farms Sugar mill.

### 2.2.10 CONTINUOUS EMISSION MONITORING SYSTEMS

PBPC will use continuous emissions monitoring systems (CEMS) on each boiler to measure pollutant emissions on a continuous basis. These will include CEMS for $SO_2$, $NO_x$, CO, and opacity for the cogeneration boilers and $NO_x$ and opacity for the package boiler. The $SO_2$, $NO_x$, and opacity monitors are required for the cogeneration boiler by federal new source performance standards (NSPS) (refer to Section 2.3 for further description). In addition, the NSPS require continuous monitoring of oxygen or carbon dioxide in the flue gases of each cogeneration boiler. The $NO_x$ and opacity monitors are required by federal NSPS for the package boiler. All continuous monitors will meet the requirements of Title 40 Code of Federal Regulations (CFR) Part 60, Appendix F.

## 2.3 APPLICABILITY OF FEDERAL NEW SOURCE PERFORMANCE STANDARDS

### 2.3.1 NSPS FOR ELECTRIC UTILITY STEAM GENERATING UNITS

Based on the maximum heat input to the cogeneration facility boilers and the type of fuel burned, the cogeneration boilers will be subject to the federal NSPS for electric utility steam generating units (40 CFR 60 Subpart Da). The Subpart Da standards are summarized in Table 2-3. The NSPS limits PM emissions to 0.03 lb/MMBtu when burning solid, liquid or gaseous fuels. An opacity limit also applies, which limits opacity to 20 percent (6-minute average), except up to 27 percent opacity is allowed for one 6-minute period per hour.

In the case of $SO_2$, the proposed cogeneration units will be classified as "resource recovery units", since combustion of non-fossil fuels will be more than 75 percent on a quarterly (calendar) heat input basis. For such units, the NSPS limit $SO_2$ emissions to 1.2 lb/MMBtu based on a 30-day rolling average for all fuel types combusted. The proposed facility will comply with the NSPS limit for $SO_2$ by burning biomass, low sulfur distillate fuel oil with a maximum sulfur content of 0.05 percent, and natural gas. The equivalent maximum $SO_2$ emission rate is 0.05 lb/MMBtu for No. 2 fuel oil. The proposed $SO_2$ emission limit for biomass is 0.06 lb/MMBtu on a 30-day rolling average, based on the inherently low sulfur content of biomass. $SO_2$ emissions due to natural gas are estimated to be 0.006 lb/MMBtu.

The NSPS for $NO_x$ is 0.30 lb/MMBtu heat input for fuel oil firing, 0.60 lb/MMBtu for solid fuels, including bagasse and wood, and 0.20 lb/MMBtu for natural gas firing. The proposed maximum $NO_x$ emission rate of 0.15 lb/MMBtu for the PBPC facility for each fuel is lower than the NSPS. Compliance with the $NO_x$ emissions limitation under Subpart Da is based on a 30-day rolling average.

The NSPS for $NO_x$ is lower for Subpart Da units for which reconstruction commenced after July 9, 1997. The boilers for PBPC were constructed prior to July, 1997. They were constructed in the period 1994-1996, and were initially placed into operation in 1996. "Reconstruction" under NSPS is defined as the replacement of components of an existing facility to such an extent that 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. In the case of the PBPC units, the cost of replacement components will not exceed the 50 percent criteria. Therefore, the more stringent NSPS for $NO_x$ is not applicable to the PBPC units.

Further requirements under 40 CFR 60 Subpart Da include emission monitoring. Continuous monitoring is required for opacity, $SO_2$, $NO_x$, and carbon dioxide or oxygen. Specifically, a continuous opacity monitor must be installed at a point free of interference from water to monitor the opacity of emissions. $SO_2$ and $NO_x$ emissions must be measured at the stack. Further, at the point $NO_x$ emissions are monitored, oxygen or carbon dioxide must be monitored. The continuous monitoring systems are to be operated and data recorded during "all periods of operation including periods of startup, shutdown, malfunction or emergency conditions, except for continuous monitoring system breakdowns, repairs, calibration checks and span adjustments" [40 CFR 60.47a(e)].

### 2.3.2 NSPS FOR INDUSTRIAL-COMMERCIAL-INSTITUTIONAL STEAM GENERATING UNITS

Based on the maximum heat input to the package boiler and the type of fuel burned, the package boiler will be subject to federal NSPS for industrial-commercial-institutional steam generating units (40 CFR 60 Subpart Db). The boiler will be classified as a high heat release boiler. The NSPS limits $NO_x$ emissions to 0.20 lb/MMBtu when burning natural gas or distillate oil. The NSPS also limits $SO_2$ to 0.80 lb/MMBtu when burning fuel oil. An opacity unit also applies, which limits opacity to

20 percent (6-minute average), except up to 27-percent opacity is allowed for one 6-minute period per hour.

The proposed package boiler will comply with the emission limits for $SO_2$, $NO_x$, and the opacity limit. The proposed $NO_x$ emission limit is 0.12 lb/MMBtu for fuel oil and 0.06 lb/MMBtu for natural gas, based on a 30-day rolling average. This is below the NSPS of 0.20 lb/MMBtu.

The NSPS emission limit for $SO_2$ will be met by using very low sulfur content fuel oil (i.e., 0.05 percent or less sulfur content by weight). This fuel is equivalent approximately to $SO_2$ emissions of 0.058 lb/MMBtu.

Further requirements under 40 CFR 60 Subpart Db include emission monitoring. Continuous monitoring is required for $NO_x$ and opacity. The continuous monitors must be operated and data recorded during "all periods of operation... except for continuous monitoring system breakdowns and repairs" [40 CFR 60.48b(c)].

### 2.3.3 NSPS FOR MUNICIPAL SOLID WASTE COMBUSTORS

U. S. Environmental Protection Agency (EPA) has promulgated revised NSPS for municipal waste combustors (MWCs). Three NSPS are potentially applicable to the PBPC steam generating units: Subpart Ea, Subpart Eb, and Subpart Cb. Subpart Ea applies to MWCs which commenced construction between December 21, 1989 and September 20, 1994; Subpart Eb applies to MWCs which commenced construction after September 20, 1994; and Subpart Cb applies to MWCs which commenced construction prior to September 20, 1994. Construction was commenced on the Osceola Power facility between December 2, 1989 and September 20, 1994. Therefore, Subparts Ea and Cb are potentially applicable to the facility.

Although PBPC intends to burn clean wood fuels in its boilers, the MWC regulations define municipal solid waste (MSW) to include yard waste if obtained from household, commercial/retail and/or institutional sources. This broad definition would encompass materials potentially burned by PBPC. However, both Subparts Ea and Cb contain exemptions from the regulations for "co-fired combustors". A co-fired combustor is a unit which combusts MSW with non-MSW fuel and

which is subject to a federally enforceable permit limiting the unit to less than 30 percent MSW (weight basis) as measured on a calendar quarter basis.

PBPC is requesting that a permit condition be imposed on each unit at the facility that limits the amount of MSW combusted to less than 30 percent by weight on a calendar quarter basis. Such a condition will insure that PBPC does not become subject to the NSPS for MWCs.

### 2.3.4 NSPS FOR VOLATILE ORGANIC LIQUID STORAGE TANKS

The distillate fuel oil storage tank will be subject to the requirements of federal NSPS for Volatile Organic Liquid (VOL) storage vessels. The NSPS applies to all tanks of greater than 15,000 gallons capacity which will store any VOL and which was constructed after July 23, 1984. The NSPS requirements for such a tank, contained in 40 CFR 60.116b, states that the owner/operator of the storage tank must maintain information relating to the dimensions and capacity of the storage tank. This information must be readily accessible and be kept for the life of the source. PBPC will comply with this requirement by maintaining tank specification information on file at the plant site.

### 2.3.5 MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY REGULATIONS

Regulations pertaining to major sources of hazardous air pollutants (HAPs) are contained in 40 CFR 63. These regulations require that major sources of HAPs apply maximum achievable control technology (MACT). The EPA has promulgated MACT regulations for a number of source categories to date. These regulations require implementation of MACT for new sources prior to startup, and for existing sources by the deadlines set for each source category. For new or reconstructed major sources of HAPs in source categories for which EPA has not yet promulgated MACT regulations, a case-by-case determination of MACT is required prior to beginning construction [40 CFR 63.42(c)]. In Florida, this requirement became effective on July 1, 1997.

EPA has not yet promulgated MACT standards for electric utility steam generating units or industrial boilers. Therefore, case-by-case MACT standards potentially could apply to the proposed PBPC facility.

PBPC is proposing to utilize existing steam generating units from the Osceola cogeneration facility. The cogeneration units were constructed prior to July 1, 1997. Reconstruction is defined in 40 CFR 63.41 as the replacement of components at an existing production unit such that the fixed

capital cost of the new components exceeds 50 percent of the fixed capital cost to construct a comparable new production unit. The PBPC cogeneration units will not trigger reconstruction under these regulations, as described below.

The original installed capital cost of the Osceola Power cogeneration boilers was approximately $22 million. This figure includes only the two cogeneration boilers. The estimated capital cost to repair, refurbish or replace component parts of the two boilers to allow restarting the units is no greater than $3 million. This cost is well below 50 percent of the cost of installing two comparable new boilers.

Based on the above analyses, new source MACT will not apply to the PBPC cogeneration units. Existing source MACT will apply to the units if and when EPA promulgates such regulations.

The package boiler is not expected to be a major source of HAPs. Therefore, new source MACT will not apply to the PBPC package boiler.

## 2.4 AIR EMISSIONS

### 2.4.1 COGENERATION BOILERS

The maximum short-term emissions for each cogeneration boiler for biomass, No. 2 fuel oil, and natural gas are presented in Table 2-4. The maximum short-term emissions for each fuel burned alone are shown.

Emission factors for biomass are based on the recently issued PSD permit for New Hope Power Partnership, as well as actual CEMS data from this facility, since PBPC will have the same types of boilers and control equipment and will burn the same type fuels as New Hope Power. Emission factors for No. 2 fuel oil and natural gas are generally based on EPA Publication AP-42 factors.

As shown in Table 2-4, emission factors are presented for $SO_2$ for the 3-hour and 24-hour averaging times, for CO for the 1-hour and 8-hour averaging times, and for fluorides (F) and sulfuric acid mist (SAM). However, these factors are provided for purposes of determining PSD applicability and for modeling purposes. No allowable emission limit is being requested for these pollutants/averaging times.

The maximum annual emissions for each boiler for three fuel combinations, including 100 percent biomass, 75.1 percent biomass/24.9 percent No. 2 fuel oil, and 75.1 percent biomass/24.9 percent natural gas, are presented in Table 2-5. The emission factors are the same as the factors used for the short-term emissions, except as noted in the table. The maximum annual emissions for any fuel scenario are indicated by the footnote. As shown, the maximum annual emissions for each pollutant occurs when combusting 100-percent biomass.

Excess emissions may occur during startup, shutdown and malfunction conditions for the proposed PBPC boilers. In order to address these situations, PBPC proposes provisions to properly exclude monitoring data used to determine compliance with emission limits. Definitions of these terms and related provisions are proposed as follows. These are the same provisions incorporated into the New Hope Power Partnership PSD permit recently issued.

1. *Startup* is the commencement of operation of a boiler which has shut down or ceased operation for a period of time sufficient to cause temperature, pressure, chemical or pollution control device imbalances, which may result in excess emissions. Periods of startup for each boiler shall end once steam generation reaches 150,000 pounds per hour. A cold startup is a startup after the boiler has been shutdown for 24 hours or more. A warm startup is a startup after the boiler has been shutdown for less than 24 hours.

2. *Shutdown* is the cessation of the operation of a boiler for any purpose after steam generation drops below 150,000 pounds per hour.

3. *Malfunction* is any unavoidable mechanical and/or electrical failure of air pollution control equipment or process equipment or of a process resulting in operation in an abnormal or unusual manner.

4. *Prohibition*: Excess emissions which are caused entirely or in part by poor maintenance, poor operation, or any other equipment or process failure which may reasonably be prevented during startup, shutdown, or malfunction shall be prohibited. Emissions data recorded during such preventable periods shall be included in the compliance averages.

5. *Monitoring Data Exclusion*: Each continuous monitoring system shall operate and record data during all periods of operation (including startup, shutdown, and malfunction) except for continuous monitoring system breakdowns, repairs, calibration checks, and zero and span adjustments. Provided the operators implement best operational practices to minimize the amount and duration of emissions, the following conditions apply.

Pursuant to Rules 62-210.700(1) and (5), F.A.C., these conditions consider the variations in operation of the cogeneration boilers.

a. Natural gas or distillate oil shall be fired during startup prior to energizing the electrostatic precipitator (ESP). Once operating temperature recommended by the ESP manufacturer is maintained (approximately 340°F to 350°F), it shall be placed on line and the boiler shall comply with the opacity standard. The ESP shall be on line and functioning properly before firing any biomass. The opacity limit does not apply when the ESP is off line due to warm startup, cold startup, or shutdown. No more than twenty 6-minute block averages of opacity monitoring data shall be excluded in a 24-hour period due to documented malfunctions.

b. Hourly CO and $NO_x$ emission rate values collected during startup, shutdown, or documented malfunction may be excluded from the 30-day and/or 12-month compliance averages. No more than six (6) hourly emission rate values (CO or $NO_x$) shall be excluded in a 24-hour period due to a cold startup. No more than three (3) hourly emission rate values (CO or $NO_x$) shall be excluded in a 24-hour period due to a warm startup. No more than two (2) hourly emission rate values (CO or $NO_x$) shall be excluded in a 24-hour period due to a malfunction. No more than two (2) hourly emission rate values (CO or $NO_x$) shall be excluded in a 24-hour period due to a shutdown. For each cogeneration boiler, no more than 183 hourly emission rate values shall be excluded during any calendar quarter.

c. All valid hourly $SO_2$ emission rate values shall be included in all of the compliance averages.

d. To "document" a malfunction, the operator shall notify the Compliance Authority within one working day of the malfunction by phone, facsimile, or electronic mail. The notification shall include the date and time of malfunction, a description of the malfunction and probable cause, steps to taken to minimize emissions, and actions taken to correct the problem.

### 2.4.2 PACKAGE BOILER

The maximum potential short-term and annual emissions from the package boiler for natural gas and No. 2 fuel oil are presented in Table 2-6. Emission factors are based on EPA Publication AP-42

emission factors, emission tests for Okeelanta's similar package boiler (Boiler No. 16) and BACT for Boiler No. 16 (Permit No. 0990005-009-AC).

### 2.4.3 MATERIAL HANDLING SYSTEM

Sources of fugitive particulate emissions were identified based on the descriptions of the biomass and ash handling and storage processes as presented in previous sections. Emissions of fugitive dust can occur from four types of biomass material handling operations: batch or continuous drop, crushing, wind erosion, and vehicular traffic. An emission inventory, identifying activities, uncontrolled emission factors, controls, activity factors, and annual fugitive dust emissions is presented in Table 2-7. These are in general the same factors and controls presented in the original application for the Osceola Power facility. Supportive information concerning wind erosion and vehicular traffic are presented in Appendix C.

Potential annual fugitive emissions from the biomass and ash handling systems are presented in Table 2-7. For the biomass handling system, the worst case flow of fuel was assumed, i.e., all of the biomass burned at the facility being delivered by truck. In reality, during the sugar processing season, all bagasse generated at the Osceola Farms sugar mill will be conveyed directly to the PBPC facility. Although many of the transfer points will be enclosed, in general no credit was taken for such control.

The maximum amount of biomass burned in the boilers will consist of approximately 708,183 TPY of wood and 964,772 TPY bagasse (refer to Appendix C, Table C-2 for derivation). An additional 50 percent processed through the material handling system was added to account for year-to-year variability in biomass fuel deliveries.

Also included in Table 2-7 is the ash silo bin vent filter. This source will emit particulate matter.

## 2.5 SIMULTANEOUS OPERATIONS WITH OSCEOLA FARMS BOILERS

During initial startup, testing and debugging of the PBPC facility, a period of simultaneous operation of the PBPC boilers and the Osceola Farms sugar mill boilers will occur. This simultaneous operation will be necessary in order to test, debug and perfect the steam connection between the sugar mill and the PBPC cogeneration facility. PBPC is requesting a limited period for simultaneous operations: no more than 120 days (2,880 hours) over the course of 1 calendar year starting with

initial firing of the PBPC boilers. The simultaneous operations would only occur during the sugar cane grinding season, approximately October through March. During this period, the Osceola Farms sugar mill requires a consistent and reliable supply of steam. The PBPC facility will not be able to provide a reliable and steady supply of steam to the sugar mill until the interconnection has been perfected.

During simultaneous operations, steam produced by the cogeneration boilers in excess of 13,680,000 lb of steam during any day will be sent to the Osceola Farms sugar mill. Concurrently, steam produced from the sugar mill boilers will be reduced by an equivalent amount. This condition will limit total air emissions during simultaneous operations to levels below that produced by both the cogeneration boilers and the sugar mill boilers operating at maximum load.

Air quality impacts associated with simultaneous operation are addressed in Section 6.0. This analysis demonstrates that AAQS and PSD increments will not be violated due to simultaneous operation of PBPC and the Osceola Farms boilers.

Table 2-1. Maximum Fuel Usage and Heat Input Rates per Cogeneration Boiler, Palm Beach Power Corp.

| Fuel | Heat Input | Heat Transfer Efficiency (%) | Heat Output | Fuel Firing Rate | |
|---|---|---|---|---|---|
| | Maximum Short-Term (per boiler) | | | | |
| | (MMBtu/hr) | | (MMBtu/hr) | | |
| Biomass - Bagasse | 760 | 68 | 517 | 211,111 | lb/hr [a] |
| - Wood | 760 | 68 | 517 | 168,889 | lb/hr [b] |
| No. 2 Fuel Oil | 600 | 85 | 510 | 4,348 | gal/hr |
| Natural Gas | 600 | 85 | 510 | 600,000 | scf/hr |
| | Annual Average (per boiler) | | | | |
| | (Btu/yr) | | (Btu/yr) | | |
| NORMAL OPERATIONS (100% BIOMASS) | | | | | |
| Biomass | 6.658E+12 | 68 | 4.527E+12 | 924,667 | TPY [a] |
| No. 2 Fuel Oil | 0 | 85 | 0 | 0 | gal/yr |
| Natural Gas | 0 | 85 | 0 | 0 | MMscf/yr |
| TOTAL | 6.658E+12 | | 4.527E+12 | | |
| 24.9% OIL FIRING | | | | | |
| Biomass | 4.707E+12 | 68 | 3.201E+12 | 653,750 | TPY [a] |
| No. 2 Fuel Oil | 1.561E+12 | 85 | 1.327E+12 | 11,309,008 | gal/yr |
| Natural Gas | 0 | 85 | 0 | 0 | MMscf/yr |
| TOTAL | 6.268E+12 | | 4.527E+12 | | |
| 24.9% NATURAL GAS FIRING | | | | | |
| Biomass | 4.707E+12 | 68 | 3.201E+12 | 653,750 | TPY [a] |
| No. 2 Fuel Oil | 0 | 85 | 0 | 0 | gal/yr |
| Natural Gas | 1.561E+12 | 85 | 1.327E+12 | 1,561 | MMscf/yr |
| TOTAL | 6.268E+12 | | 4.527E+12 | | |

[a] Based on bagasse firing.

[b] Based on wood firing.

Notes:

40 CFR 60, Subpart Da, limits fossil-fuel firing to less than 25% for each boiler (heat input basis).

Total heat output required = 4.527E+12 Btu/yr per boiler.

Fuels may be burned in combination, not to exceed total heat outputs.

Based on fuel heating values as follows:

Bagasse - 3,600 Btu/lb
Wood - 4,500 Btu/lb
No. 2 Fuel Oil - 138,000 Btu/gal
Natural gas - 1,000 Btu/scf

Table 2-2. Stack Parameters for Project Sources, Palm Beach Power Corp.

| Source | Location X (m) | Location Y (m) | Heat Input Rate (MMBtu/hr) | Stack Height (ft) | Stack Diameter (ft) | Actual Gas Flowrate (acfm) | Gas Velocity (ft/s) | Gas Temperature (°F) |
|---|---|---|---|---|---|---|---|---|
| Cogeneration Boilers (each) | 0 | 0 | | | | | | |
| -Biomass | --- | --- | 760 | 199 | 8.0 | 246,000 - 326,000 | 81.6 - 108.1 | 295 - 340 |
| -No. 2 Fuel Oil | --- | --- | 600 | 199 | 8.0 | 170,000 - 184,000 | 56.4 - 61.0 | 295 - 350 |
| -Natural Gas | --- | --- | 600 | 199 | 8.0 | 170,000 - 184,000 | 56.4 - 61.0 | 295 - 350 |
| Package Boiler | 40 | -79 | | | | | | |
| -No. 2 Fuel Oil | --- | --- | 202 | 75 | 5.0 | 88,200 | 75 | 410 |
| -Natural Gas | --- | --- | 211 | 75 | 5.0 | 88,200 | 75 | 410 |
| Fly Ash Silo Filter | -42 | -38 | -- | 110 | 2.0 x 2.0 | 2,500 | 10.4 | 100 |

Note: acfm = actual cubic feet per minute
°F = degrees Fahrenheit
ft = feet
ft/s = feet per second

Table 2-3. Federal NSPS for Electric Utility Steam-Generating Units Applicable to the Palm Beach Power Cogeneration Boilers

| Pollutant | Fuel Type | Emission Limitation |
|---|---|---|
| Particulate Matter | Liquid Fuel | 0.03 lb/MMBtu |
| | Solid Fuel | 0.03 lb/MMBtu |
| | Gaseous Fuel | 0.03 lb/MMBtu |
| Visible Emissions | All Fuels | 20% opacity (6-minute average), except up to 27% opacity is allowed for one 6-minute period per hour |
| Sulfur Dioxide[a] | All Fuels | Resource Recovery Units – 1.20 lb/MMBtu |
| Nitrogen Oxides[a] | | |
| 1. Commence construction prior to 07/07/97 | Liquid Fuel | 0.30 lb/MMBtu |
| | Biomass Fuel | 0.60 lb/MMBtu |
| | Gaseous Fuel | 0.20 lb/MMBtu |
| 2. Commence construction after 07/08/97 | Liquid Fuel | 1.6 lbs/MW-hr |
| | Biomass Fuel | 1.6 lbs/MW-hr |
| | Gaseous Fuel | 1.6 lbs/MW-hr |
| 3. Reconstruction commenced after 07/09/97 | Liquid Fuel | 0.15 lb/MMBtu |
| | Biomass Fuel | 0.15 lb/MMBtu |
| | Gaseous Fuel | 0.15 lb/MMBtu |

[a] Compliance determined on a 30-day, rolling average basis.

Note: Emission limits for PM, $NO_x$, and $SO_2$ do not apply during periods of startup, shutdown, or malfunction.
lb/MMBtu = pounds per million Btu.
Lb/MW-hr = pounds per megawatt-hour.

Source: 40 CFR 60, Subpart Da.

Table 2-4. Maximum Short-Term Emissions for Palm Beach Power Corp. (per cogeneration boiler)

| Regulated Pollutant | Biomass Emission Factor (lb/MMBtu) | Ref. | Biomass Activity Factor (MMBtu/hr) | Biomass Maximum Emissions (lb/hr) | No. 2 Fuel Oil Emission Factor (lb/MMBtu) | Ref. | No. 2 Fuel Oil Activity Factor (MMBtu/hr) | No. 2 Fuel Oil Maximum Emissions (lb/hr) | Natural Gas Emission Factor (lb/MMBtu) | Ref. | Natural Gas Activity Factor (MMBtu/hr) | Natural Gas Maximum Emissions (lb/hr) | Maximum Emissions for any fuel (lb/hr) | Total Two Boilers (lb/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Particulate ($PM/PM_{10}$) | 0.03 | (1) | 760 | 22.8 | 0.03 | (1) | 600 | 18.00 | 0.0076 | (4) | 600 | 4.56 | 22.80 | 45.60 |
| Sulfur Dioxide | | | | | | | | | | | | | | |
| --3-hr Average | 0.30 | (6) | 760 | 228.0 | -- | | -- | -- | -- | | -- | -- | 228.0 | 456.0 |
| --24-hr Average | 0.20 | (2) | 760 | 152.0 | 0.05 | (7) | 600 | 30.00 | 0.006 | (4) | 600 | 3.60 | 152.0 | 304.0 |
| Nitrogen Oxides | 0.20 | (6) | 760 | 152.0 | 0.20 | (6) | 600 | 120.00 | 0.20 | (6) | 600 | 120 | 152.0 | 304.0 |
| Carbon Monoxide | | | | | | | | | | | | | | |
| --1-hr Average (cold start-up) | 6.5 | (6) | 760 | 4,940.0 | 0.036 | (8) | 600 | 21.6 | 0.084 | (4) | 600 | 50.4 | 4,940.0 | 9,880.0 |
| --1-hr Average (normal operation) | 1.8 | (6) | 760 | 1,368.0 | -- | | -- | -- | -- | | -- | -- | 1,368.0 | 2,736.0 |
| --8-hr Average (cold start-up) | 4.5 | (6) | 760 | 3,420.0 | -- | | -- | -- | -- | | -- | -- | 3,420.0 | 6,840.0 |
| --8-hr Average (normal) | 1.0 | (6) | 760 | 760.0 | -- | | -- | -- | -- | | -- | -- | 760.0 | 1,520.0 |
| VOC | 0.06 | (2) | 760 | 45.6 | 0.0014 | (8) | 600 | 0.84 | 0.0055 | (4) | 600 | 3.30 | 45.60 | 91.20 |
| Mercury | 5.4E-06 | (2) | 760 | 4.10E-03 | 3.0E-06 | (8) | 600 | 1.8E-03 | 2.6E-07 | (4) | 600 | 1.6E-04 | 4.10E-03 | 8.21E-03 |
| Fluorides | 7.0E-04 | (3) | 760 | 0.532 | -- | | -- | -- | -- | | -- | -- | 0.53 | 1.06 |
| Lead | 1.5E-04 | (2) | 760 | 0.11 | 9.0E-06 | (8) | 600 | 5.4E-03 | 5.0E-07 | (4) | 600 | 3.0E-04 | 0.11 | 0.23 |
| Sulfuric Acid Mist | | | | | | | | | | | | | | |
| --3-hr Average | 0.0184 | (5) | 760 | 13.98 | 0.0015 | (5) | 600 | 0.9000 | 3.68E-04 | (5) | 600 | 0.22 | 13.98 | 27.97 |

References:

1. NSPS, 40 CFR 60, Subpart Da.
2. Based on New Hope Power Partnership's (Okeelanta Power) Permit No. 0990332-014-AC.
3. Based on maximum of 3 most recent stack tests (1999-2001) for New Hope Power Partnership.
4. Based on AP-42 Section 1.4 for natural gas combustion:

| | |
|---|---|
| PM (total): | 7.6 $lb/10^6$ scf |
| $SO_2$: | 0.6 $lb/10^6$ scf |
| CO: | 84 $lb/10^6$ scf |
| VOC: | 5.5 $lb/10^6$ scf |
| Mercury: | 2.6E-04 $lb/10^6$ scf |
| Lead: | 0.0005 $lb/10^6$ scf |

5. Based on the $SO_2$ emission factor and a 5% of conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
6. Based on CEM data from New Hope Power Partnership (Okeelanta Cogen Facility).
7. Based on use of No. 2 fuel oil with a maximum of 0.05% sulfur.
8. From AP-42, Section 1.3 for fuel oil combustion:

| | |
|---|---|
| CO: | 5 lb/1,000 gal |
| VOC: | 0.2 lb/1,000 gal |
| Mercury: | 3 $lb/10^{12}$ Btu |
| Lead: | 9 $lb/10^{12}$ Btu |

Table 2-5. Maximum Annual Emissions Per Cogeneration Boiler for Palm Beach Power Corp.

| Regulated Pollutant | Biomass Emission Factor (lb/MMBtu) | Ref. | Biomass Activity Factor (E12 Btu/yr) | Biomass Annual Emissions (TPY) | Alternate Fuel Emission Factor (lb/MMBtu) | Alternate Fuel Activity Factor (E12 Btu/yr) | Alternate Fuel Annual Emissions (TPY) | Total Annual Emissions Per Boiler (TPY) |
|---|---|---|---|---|---|---|---|---|
| | | | | 100% Biomass | | | | |
| Particulate ($PM/PM_{10}$) | 0.03 | | 6.658 | 99.87 | -- | -- | -- | 99.87 [a] |
| Sulfur dioxide[c] | 0.06 | (1) | 6.658 | 199.74 | -- | -- | -- | 199.74 [a] |
| Nitrogen oxides[b] | 0.15 | | 6.658 | 499.35 | -- | -- | -- | 499.35 [a] |
| Carbon monoxide[c] | 0.35 | (1) | 6.658 | 1,165.15 | -- | -- | -- | 1,165.15 [a] |
| VOC | 0.06 | | 6.658 | 199.74 | -- | -- | -- | 199.74 [a] |
| Mercury | 5.4E-06 | | 6.658 | 0.0180 | -- | -- | -- | 0.018 [a] |
| Fluorides | 7.0E-04 | | 6.658 | 2.3303 | -- | -- | -- | 2.3303 [a] |
| Lead | 1.5E-04 | | 6.658 | 0.499 | -- | -- | -- | 0.50 [a] |
| Sulfuric acid mist | 0.0037 | (2) | 6.658 | 12.23 | -- | -- | -- | 12.234 [a] |
| | | | | 75.1% Biomass / 24.9% Fuel Oil | | | | |
| Particulate ($PM/PM_{10}$) | 0.03 | | 4.707 | 70.61 | 0.03 | 1.561 | 23.42 | 94.02 |
| Sulfur dioxide[c] | 0.06 | (1) | 4.707 | 141.21 | 0.05 | 1.561 | 39.03 | 180.24 |
| Nitrogen oxides[b] | 0.15 | | 4.707 | 353.03 | 0.15 | 1.561 | 117.08 | 470.10 |
| Carbon monoxide[c] | 0.35 | (1) | 4.707 | 823.73 | 0.036 | 1.561 | 28.10 | 851.82 |
| VOC | 0.06 | | 4.707 | 141.21 | 0.0014 | 1.561 | 1.09 | 142.30 |
| Mercury | 5.40E-06 | | 4.707 | 0.0127 | 3.0E-06 | 1.561 | 0.0023 | 0.0151 |
| Fluorides | 7.00E-04 | | 4.707 | 1.6475 | -- | -- | -- | 1.6475 |
| Lead | 1.5E-04 | | 4.707 | 0.353 | 9.0E-06 | 1.561 | 7.02E-03 | 0.36 |
| Sulfuric acid mist | 0.0037 | (2) | 4.707 | 8.65 | 0.0015 | 1.561 | 1.17 | 9.82 |
| | | | | 75.1% Biomass / 24.9% Natural Gas | | | | |
| Particulate ($PM/PM_{10}$) | 0.03 | | 4.707 | 70.61 | 0.0076 | 1.561 | 5.93 | 76.54 |
| Sulfur dioxide[c] | 0.06 | (1) | 4.707 | 141.21 | 0.006 | 1.561 | 4.68 | 145.89 |
| Nitrogen oxides[b] | 0.15 | | 4.707 | 353.03 | 0.15 | 1.561 | 117.08 | 470.10 |
| Carbon monoxide[c] | 0.35 | (1) | 4.707 | 823.73 | 0.08 | 1.561 | 65.56 | 889.29 |
| VOC | 0.06 | | 4.707 | 141.21 | 0.0055 | 1.561 | 4.29 | 145.50 |
| Mercury | 5.40E-06 | | 4.707 | 0.0127 | 2.6E-07 | 1.561 | 0.0002 | 0.0129 |
| Fluorides | 7.00E-04 | | 4.707 | 1.6475 | -- | -- | -- | 1.6475 |
| Lead | 1.5E-04 | | 4.707 | 0.353 | 5.0E-07 | 1.561 | 0.0004 | 0.35 |
| Sulfuric acid mist | 0.0037 | (2) | 4.707 | 8.65 | 3.68E-04 | 1.561 | 0.29 | 8.94 |

[a] Denotes maximum annual emissions for any fuel scenario.

[b] Based on 30-day rolling average.

[c] Based on 12-month rolling average.

Note: Fuel type percentages are based on heat input.

References:

Unless otherwise note, refer to Table 2-2 for reference.

1. Based on New Hope Power Partnership (Okeelanta Cogen) Permit No. 0990332-014-AC.
2. Based on the $SO_2$ emission factor and 5% conversion of $SO_2$ to $SO_3$ and taking into account the ratio of the molecular weights (98/80).

Table 2-6. Future Maximum Emissions from the Package Boiler, Palm Beach Power Corp.

| Regulated Pollutant | Natural Gas Combustion | | | | | | No. 2 Fuel Oil Combustion | | | | | | Maximum Annual Emissions Due to Any Combination[c] (TPY) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Emission Factor ($lb/10^6$ scf) | Emission Factor (lb/MMBtu) | Ref. | Activity Factor[a] (MMBtu/hr) | Hourly Emissions (lb/hr) | Annual Emissions[b] (TPY) | Emission Factor (lb/1000 gal) | Emission Factor (lb/MMBtu) | Ref. | Activity Factor[a] (MMBtu/hr) | Hourly Emissions (lb/hr) | Annual Emissions[b] (TPY) | |
| Particulate Matter (PM) | 1.9 | 1.86E-03 | 1 | 211 | 0.39 | 1.72 | -- | 0.032 | 4 | 202 | 6.46 | 28.31 | 28.31 |
| Particulate Matter ($PM_{10}$) | 1.9 | 1.86E-03 | 1 | 211 | 0.39 | 1.72 | -- | 0.032 | 4 | 202 | 6.46 | 28.31 | 28.31 |
| Sulfur dioxide ($SO_2$) | 0.6 | 5.88E-04 | 1 | 211 | 0.12 | 0.54 | 7.85 | 0.058 | 5 | 202 | 11.66 | 51.07 | 51.07 |
| Nitrogen oxides ($NO_x$)--24-hour | -- | 0.10 | 7 | 211 | 21.10 | 92.42 | -- | 0.20 | 7 | 202 | 40.40 | 176.95 | 176.95 |
| --30-day rolling average | -- | 0.06 | 7 | 211 | 12.66 | 55.45 | -- | 0.12 | 7 | 202 | 24.24 | 106.17 | 106.17 |
| Carbon monoxide (CO) | -- | 0.10 | 7 | 211 | 21.10 | 92.42 | -- | 0.11 | 7 | 202 | 22.22 | 97.32 | 97.32 |
| VOC | -- | 0.03 | 2 | 211 | 6.33 | 27.73 | -- | 0.03 | 2 | 202 | 6.06 | 26.54 | 27.73 |
| Sulfuric acid mist (SAM) | -- | 3.60E-05 | 3 | 211 | 7.60E-03 | 0.03 | -- | 0.0026 | 6 | 202 | 0.52 | 2.27 | 2.27 |
| Lead (Pb) | 5.E-04 | 4.90E-07 | 1 | 211 | 1.03E-04 | 4.53E-04 | -- | 9.00E-06 | 5 | 202 | 1.82E-03 | 7.96E-03 | 7.96E-03 |
| Mercury (Hg) | 2.6E-04 | 2.55E-07 | 1 | 211 | 5.38E-05 | 2.36E-04 | -- | 3.00E-06 | 5 | 202 | 6.06E-04 | 2.65E-03 | 2.65E-03 |
| Beryllium (Be) | 1.2E-05 | 1.18E-08 | 1 | 211 | 2.49E-06 | 1.09E-05 | -- | 3.00E-06 | 5 | 202 | 6.06E-04 | 2.65E-03 | 2.65E-03 |
| Fluorides (Fl) | -- | -- | | -- | -- | -- | -- | -- | | -- | -- | -- | -- |

References:

1. Factors for natural gas combustion from AP-42, Tables 1.4-2 and 1.4-4 (7/98). Factors were converted to lb/MMBtu by dividing by 1,020 Btu/scf.

| | |
|---|---|
| PM: | 1.9 $lb/10^6$ scf |
| $SO_2$: | 0.6 $lb/10^6$ scf |
| Pb: | 5E-04 $lb/10^6$ scf |
| Hg: | 2.6E-04 $lb/10^6$ scf |
| Be: | 1.2E-05 $lb/10^6$ scf |

2. Based on emission guarantees from vendor.
3. Based on similar derivation of sulfuric acid mist from AP-42 for fuel oil. 5% of $SO_2$ becomes $SO_3$ then take into account the ratio of sulfuric acid mist and gaseous sulfate molecular weights (98/80).
4. Based on emission test results for Okeelanta Boiler No. 16.
5. Factors for No. 2 fuel oil combustion, AP-42 Table 1.3-1 and 1.3-10 (9/98). A heating value of 136,000 Btu/gal and a maximum sulfur content of 0.05% were used for the No. 2 fuel oil.

| | | |
|---|---|---|
| $SO_2$: | 157S lb/1000 gal | (Note: AP-42 is believed to be in error, and the correct factor should be 1,42S lb/1000 gal) |
| Pb: | 3 $lb/10^{12}$ Btu | |
| Hg: | 3 $lb/10^{12}$ Btu | |
| Be: | 9 $lb/10^{12}$ Btu | |

6. The emission factor for $SO_3$ emissions from a No. 2 fuel fired boiler with low $NO_x$ burners (5.7S $lb/10^3$ gal where S is the sulfur content) was multiplied by the ratio of sulfuric acid mist and gaseous sulfate molecular weights (98/80).
7. Based on BACT for New Hope Power Partnership's similar package boiler (Boiler No. 16, Permit No. 0990005-009-AC).

Footnotes:

[a] The proposed maximum permitted heat input rate is 211 MMBtu/hr for natural gas and 202 MMBtu/hr for fuel oil.

[b] Based on maximum proposed operation of 8,760 hours.

[c] Maximum emissions predicted for either natural gas or No. 2 fuel oil combustion.

le 2-7. Palm Beach Power Corp. Facility Maximum Annual Fugitive Dust Emissions

| SOURCE | TYPE OF OPERATION | M MOISTURE CONTENT (%) | U WIND SPEED (MPH) | UNCONTROLLED PM EMISSION FACTOR (LB/TON) [a] | UNCONTROLLED $PM_{10}$ EMISSION FACTOR (LB/TON) [a] | CONTROL | CONTROL EFFICIENCY (%) | CONTROLLED PM EMISSION FACTOR (LB/TON) | CONTROLLED $PM_{10}$ EMISSION FACTOR (LB/TON) | ACTIVITY FACTOR | MAXIMUM ANNUAL PM(TSP) EMISSIONS (TONS/YR) | MAXIMUM ANNUAL $PM_{10}$ EMISSIONS (TONS/YR) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BIOMASS HANDLING** | | | | | | | | | | | | |
| TRUCK DUMPS (2) | BATCH DROP | 37 | 9.4 | 0.00009 | 0.00004 | NONE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| CHAIN CONVEYORS-TO-UNLOADING CONVEYOR (2) | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| UNLOADING CONVEYOR-TO-SCREEN | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| SCREEN | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | NONE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| SCREEN-TO-HOGGER | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| HOGGER | CRUSHING | -- | -- | 0.02 [h] | 0.009 [h] | ENCLOSED | 95 | 0.001 | 0.00045 | 2,509,432 TPY [g] | 1.255 | 0.565 |
| HOGGER-TO-STORAGE CONVEYOR | BATCH DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| SCREEN-TO-STORAGE CONVEYOR | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 0 TPY | 0.000 | 0.000 |
| SCREEN-TO-BOILER FEED CONVEYOR | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 0 TPY | 0.000 | 0.000 |
| STORAGE CONVEYOR-TO-RADIAL STACKER | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| RADIAL STACKER-TO-BIOMASS STORAGE PILE | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | NONE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| UNDERPILE RECLAIMERS (2) | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSED | 90 | 0.00001 | 0.000004 | 2,509,432 TPY [g] | 0.011 | 0.005 |
| RECLAIMERS-TO-BOILER FEED CONVEYOR (2) | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| BOILER FEED CONVEYOR-TO-CHAIN DIST. CONVEYOR (2) | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| CHAIN DIST. CONVEYOR -TO-BOILER METER BINS (4) | BATCH DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 2,509,432 TPY [g] | 0.114 | 0.054 |
| AGASSE CONVEYOR-TO-CHAIN DIST CONVEYOR (2) | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 0 TPY | 0.000 | 0.000 |
| ASSE CONVEYOR-TO-RECYCLE CONVEYOR | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 0 TPY | 0.000 | 0.000 |
| CHAIN DIST. CONVEYORS-TO-RECYCLE CONVEYOR (2) | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 250,943 TPY [f] | 0.011 | 0.005 |
| RECYCLE CONVEYOR-TO-RECYCLE STACKER | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 0 TPY | 0.000 | 0.000 |
| RECYCLE CONVEYOR-TO-STORAGE CONVEYOR | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | ENCLOSURE | 0 | 0.00009 | 0.00004 | 250,943 TPY [f] | 0.011 | 0.005 |
| RECYCLE STACKER-TO-BIOMASS STORAGE PILE | CONTINUOUS DROP | 37 | 9.4 | 0.00009 | 0.00004 | NONE | 0 | 0.00009 | 0.00004 | 0 TPY | 0.000 | 0.000 |
| BIOMASS STORAGE PILES (2) | WIND EROSION | -- | -- | -- | | NONE | 0 | -- | -- | -- | 0.175 [d] | 0.087 [d] |
| BIOMASS STORAGE PILE MAINTENANCE | VEHICULAR TRAFFIC | -- | -- | 0.75 lb/VMT[b] | 0.23 lb/VMT[b] | WATERING | 50 | 0.38 | 0.11 lb/VMT | 21,900 VMT [c] | 4.110 [d] | 1.253 [d] |
| **FLY ASH HANDLING** | | | | | | | | | | | | |
| FLY ASH SILO FILTER | -- | -- | -- | -- | -- | BAGHOUSE | 99 | 0.01 | 0.01 gr/acf | 2,500 acfm | 0.939 | 0.013 |
| FLY ASH TRANSFER-TO-TRUCK | CONTINUOUS DROP | 5.0 | 9.4 | 0.00149 | 0.00071 | WETTING | 50 | 0.00075 | 0.00035 | 14,677 TPY [e] | 0.005 | 0.003 |
| **TOTAL** | | | | | | | | | | | 7.767 | 2.527 |

Notes/References:

[a] Batch Drop and Continuous Drop Emission Factors are computed from AP-42 (USEPA, 1995) Section 13.2.4:
E= k x 0.0032 x (U/5)^1.3 / (M/2)^1.4 lb/ton, where k = 0.74 for PM and 0.35 for $PM_{10}$.

[b] Pound per Vehicle Mile Travel (lb/VMT), see Appendix C, Table C-1 for derivation.

[c] Based on vehicle operating 12 hrs/day, 365 days/yr @ 5 mph.

[d] Refer to Appendix C for derivation.

[e] Based on 708,183 TPY woodwaste @ 9% ash and 964,772 TPY bagasse @ 1% ash. Assuming 80% is bottom ash and 20% is fly ash. Refer to Table C-2.

[f] Assuming 10% of biomass is overfeed and is returned to biomass storage pile.

[g] Activity Factor based on 13.32E+12 Btu/yr; 47.9% is from wood (4,500 Btu/lb) and the remaining 52.1% is from bagasse (3,600 Btu/lb) = 1,672,955 TPY; an additional 50% throughput was added to account for year-to-year variations.

[h] Emission factor derived from AP-42 (USEPA, 1982) Section 11.24-2 for high moisture ore.

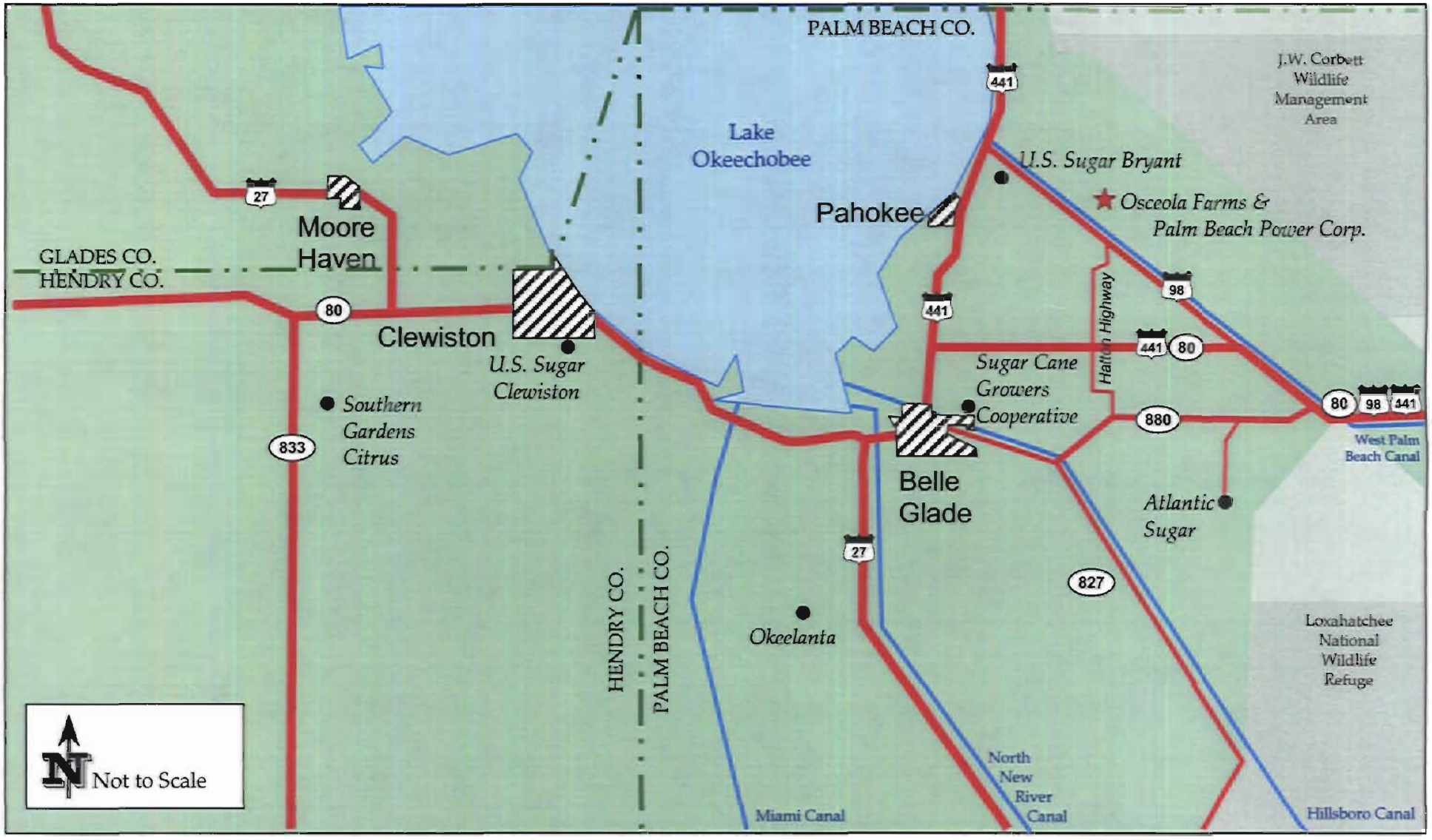



**Figure 2-1**
Location of Palm Beach Power Corp.

Source: Golder Associates Inc., 2002.

Golder Associates

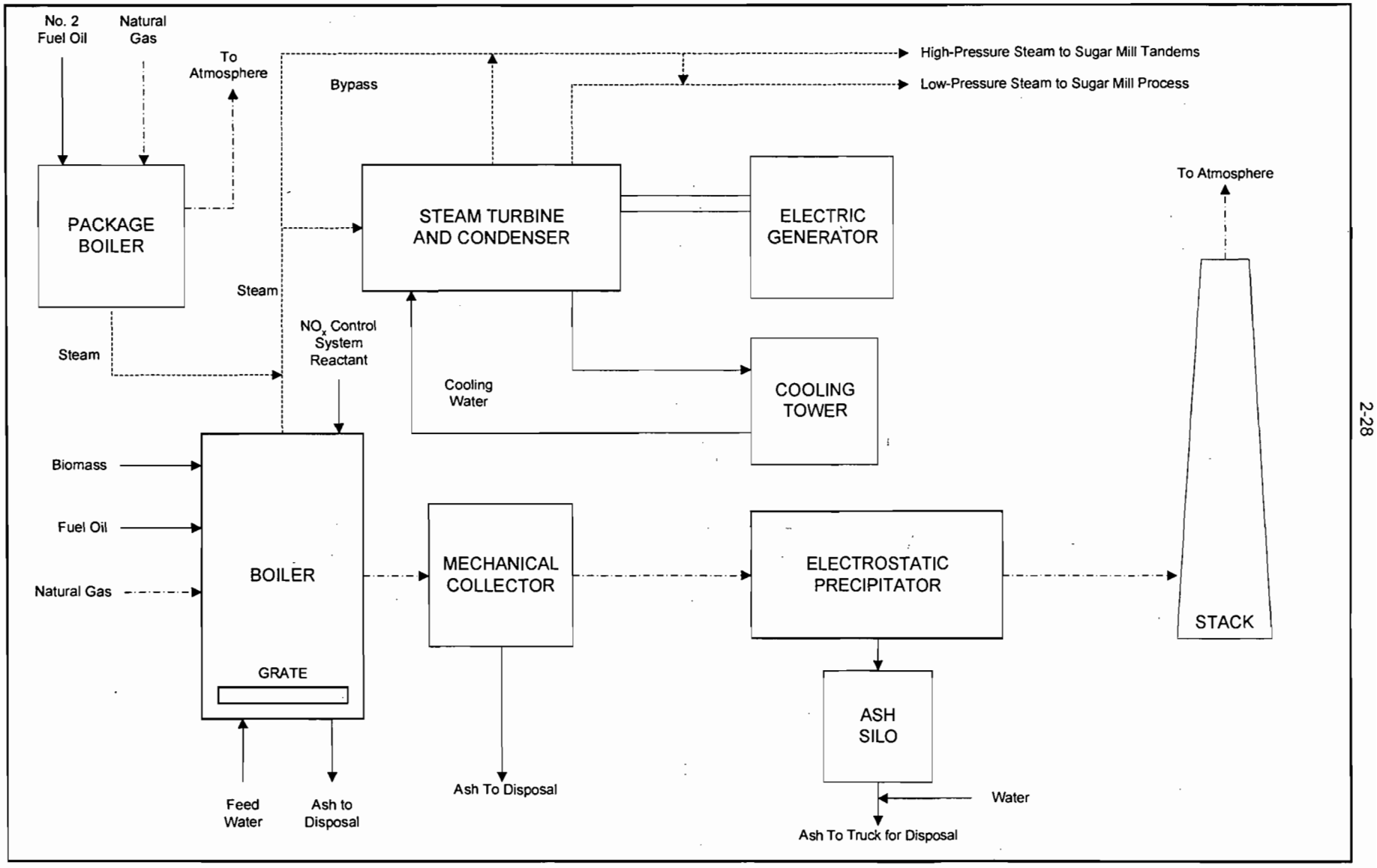



Figure 2-2
Simplified Flow Diagram
Palm Beach Power Corp.

**Process Flow Legend**
Solid/Liquid
Steam
Gas

Filename: 0137678\4\4.4\4.4.1\Figure 2-2
Date: 04/02/02

Golder Associates

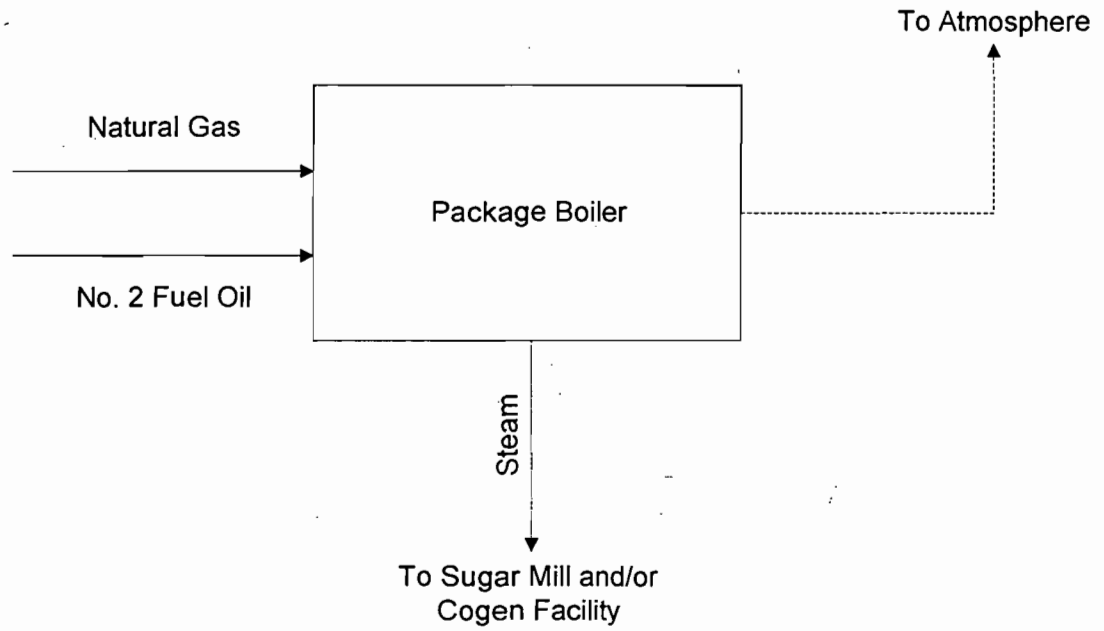



Figure 2-3
Package Boiler
Palm Beach Power Corp.

**Process Flow Legend**
Solid/Liquid
Gas
Steam

Package Boiler

Filename: FIGURE 2-3.VSD

Date: 04/01/02

Golder Associates

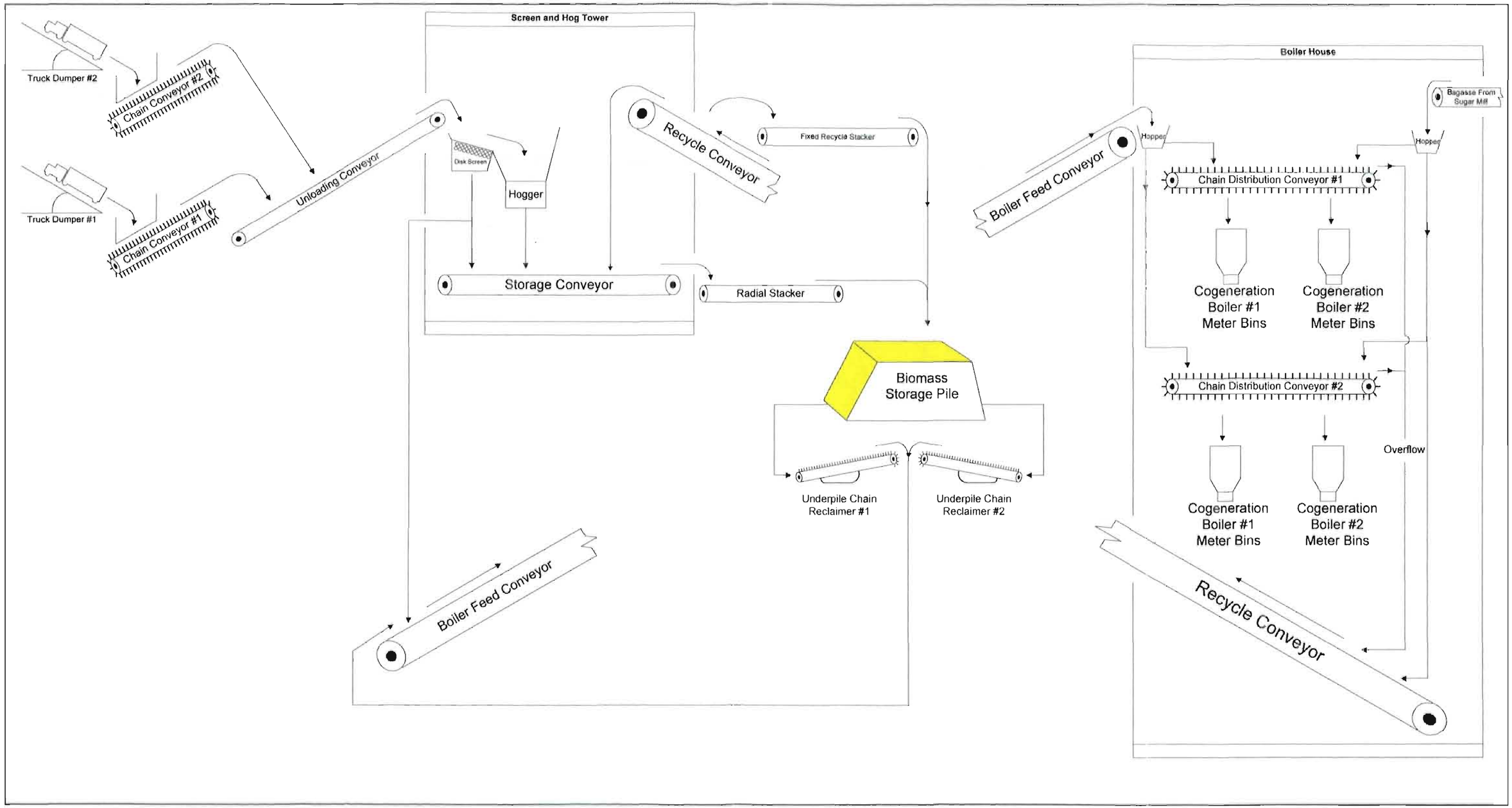



Figure 2-4
Palm Beach Power Material Handling System

Palm Beach Power Corp. | Pahokee, Florida

***Legend***

Bagasse and/or Wood Chips →

Golder Associates

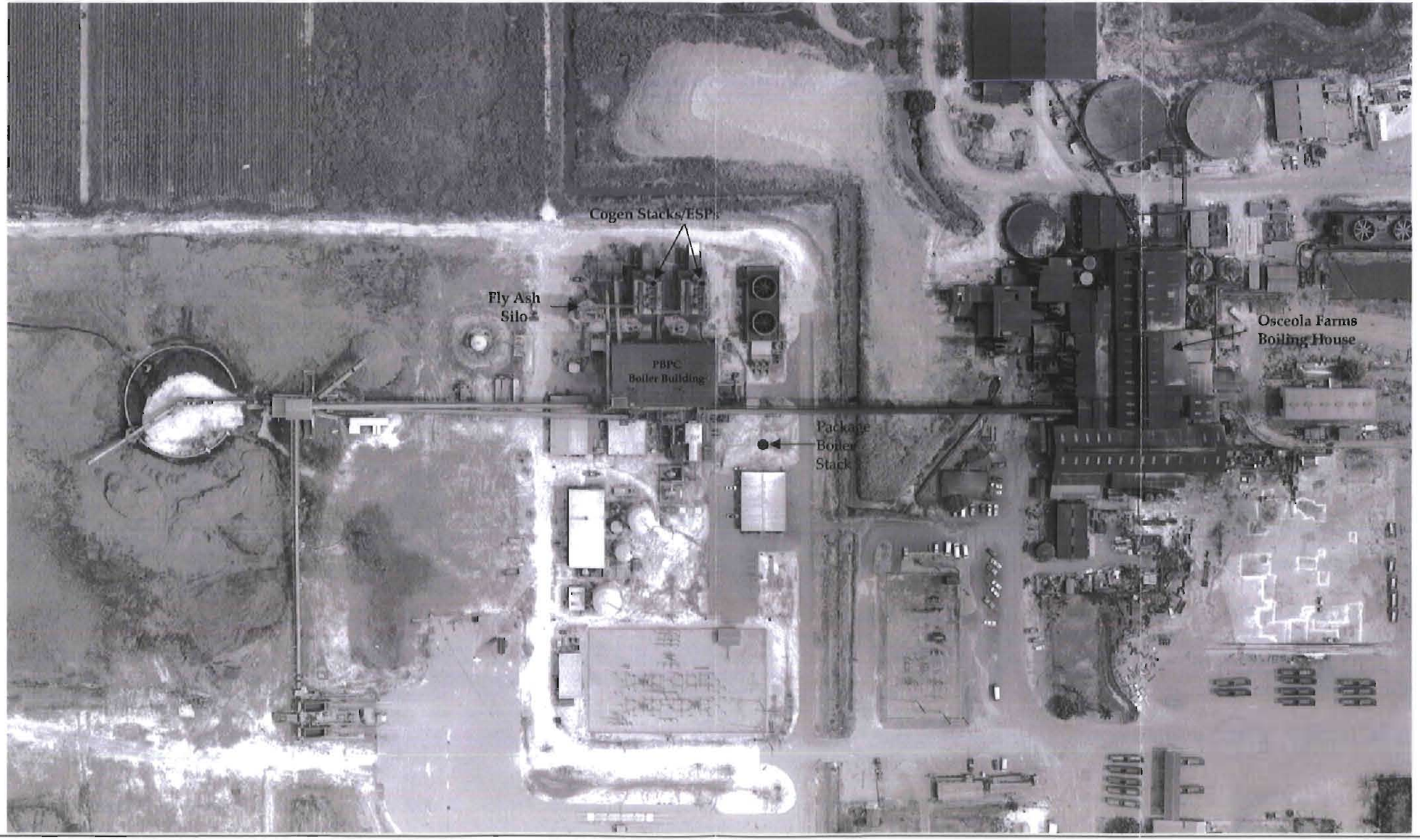
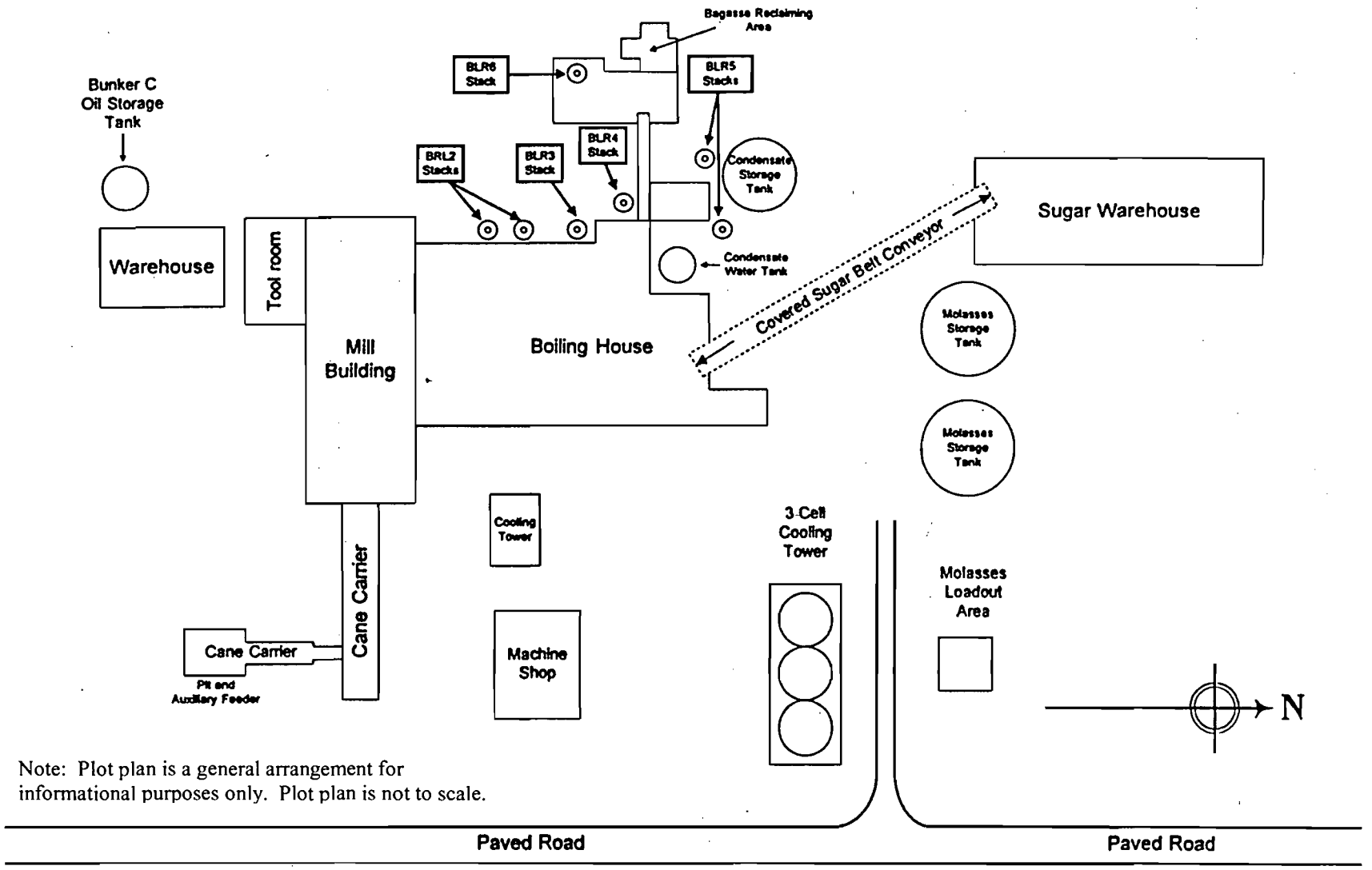



Figure 2-5
Facility Plot Plan - Palm Beach Power Corp.

Source: Photogrammetric Technologies, Inc., 2002; Golder, 2002.

Golder Associates




Note: Plot plan is a general arrangement for informational purposes only. Plot plan is not to scale.

Figure 2-6. Osceola Farms Sugar Mill Plot Plan
Pahokee, Florida

Source: Golder, 2001.

Golder Associates

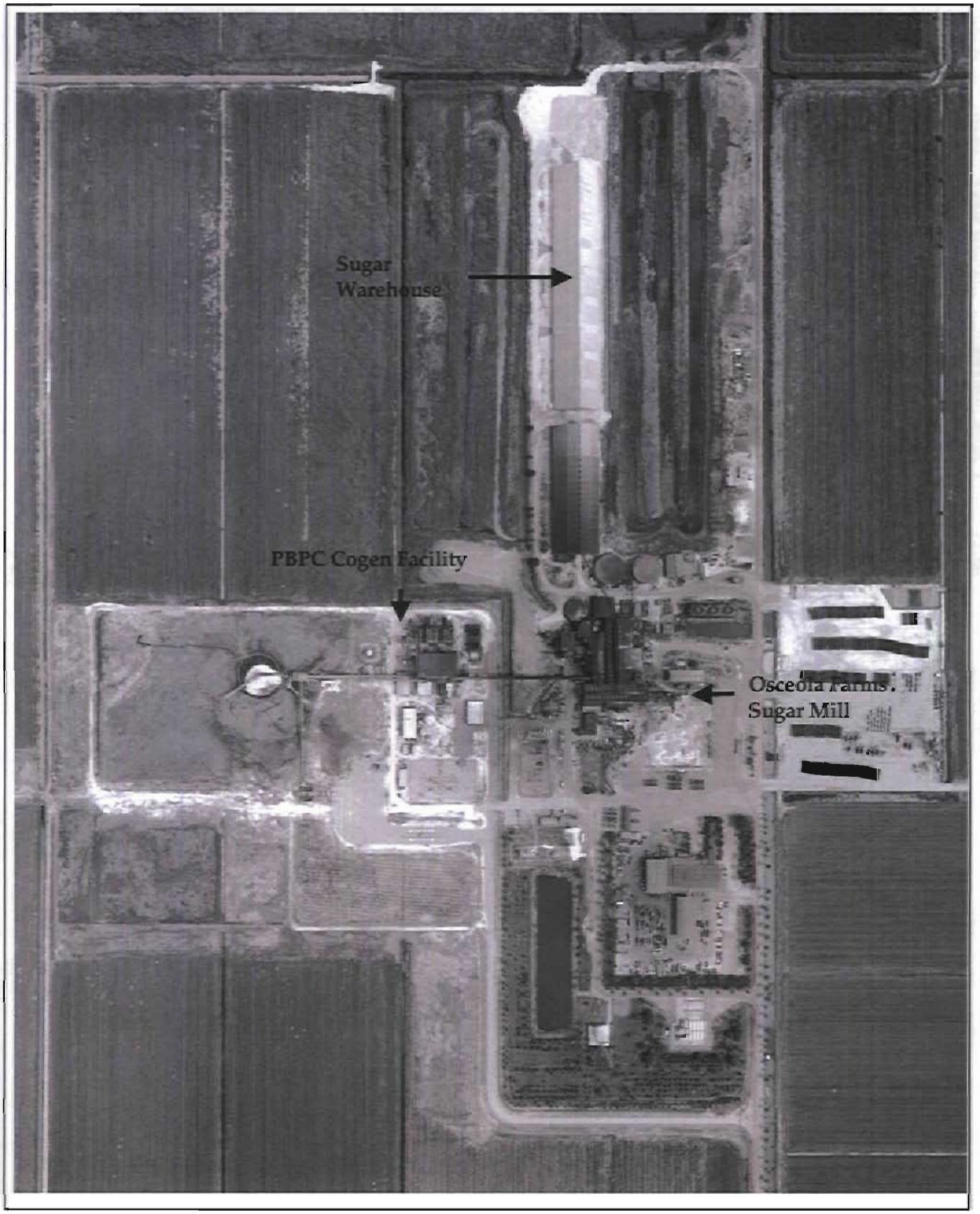



Figure 2-7. Expanded Plot Plan of Proposed Cogeneration Facility
Palm Beach Power Corp.

Source: Photogrammetric Technologies, Inc., 2002; Golder, 2002.

Golder Associates

# 3.0 AIR QUALITY REVIEW REQUIREMENTS

Federal and state air regulatory requirements for major new or modified sources of air pollution are discussed in Sections 3.1 through 3.4. The applicability of these regulations to the proposed PBPC facility is presented in Section 3.5. These regulations must be satisfied before the proposed project can be approved.

## 3.1 NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS (AAQS)

The existing applicable national and Florida 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 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 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 EPA; therefore, PSD approval authority has been granted to the FDEP.

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 TPY or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under CAA. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. Once a new source is determined to be a "major facility" for a particular pollutant, any pollutant emitted in amounts greater than the PSD significant emission rates is subject to PSD review. 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. The PSD significant emission rates are shown in Table 3-2.

The EPA class designation and allowable PSD increments are 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 Clean Air Act 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 $NO_2$.

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 40 CFR 52.21, Prevention of Significant Deterioration of Air Quality. The State of Florida has adopted the federal PSD regulations by reference (Rule 62-212.400 F.A.C.). Major facilities and major modifications are required to undergo the following analysis related to PSD for each pollutant emitted in significant amounts:

1. Control technology review,
2. Source impact analysis,
3. Air quality analysis (monitoring),
4. Source information, and
5. Additional impact analyses.

In addition to these analyses, a new 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 of major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determination 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 Best Available Control Technology (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 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 proposed 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 II increments, a source impact analysis must be performed for the criteria pollutants. 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 affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with AAQS and PSD increments.

EPA has proposed significant impact levels for Class I areas as follows:

| | | |
|---|---|---|
| $SO_2$ | 3-hour | 1.0 $\mu g/m^3$ |
| | 24-hour | 0.2 $\mu g/m^3$ |
| | Annual | 0.1 $\mu g/m^3$ |
| $PM_{10}$ | 24-hour | 0.3 $\mu g/m^3$ |
| | Annual | 0.2 $\mu g/m^3$ |
| $NO_2$ | Annual | 0.1 $\mu g/m^3$ |

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 review, the proposed 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 in the PSD process is part of implementing the NSR provisions of the 1990 CAA Amendments. Because the process of developing the regulations will be lengthy, EPA believes that the proposed rules concerning the significant impact levels is appropriate in order to assist states in implementing the PSD permit process.

Various lengths of record for meteorological data can be used for impact analysis. 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 include 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 additional 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:

1. The actual emissions representative of facilities in existence on the applicable baseline date; and
2. The allowable emissions of major stationary facilities that commenced construction before January 6, 1975, for $SO_2$ and $PM_{10}$ concentrations, or February 8, 1988, for $NO_2$ concentrations, 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:

1. Actual emissions from any major stationary facility on which construction commenced after January 6, 1975, for $SO_2$ and $PM_{10}$ concentrations, and after February 8, 1988, for $NO_2$ concentrations; and
2. 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:

1. 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 $NO_2$.
2. 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. The trigger date, which is August 7, 1977, for $SO_2$ and $PM_{10}$, and February 8, 1988, for $NO_2$.

### 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 new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceed 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 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 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.

### 3.2.5 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:

1. 65 meters (m); or
2. 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

3. 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. 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.

### 3.2.6 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 [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, or for which the net increase in emissions exceeds the significant emission rates (Table 3-2).

## 3.3 NONATTAINMENT RULES

Based on the current nonattainment provisions, all major new facilities and modifications to existing major facilities located in a nonattainment area must undergo nonattainment review. A new major facility is required to undergo this review if the proposed pieces of equipment have the potential to emit 100 TPY or more of the nonattainment pollutant.

## 3.4 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 1977, 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."

Federal NSPS exist for electric utility steam generating units (40 CFR 60 Subpart Da). The NSPS apply to all units capable of combusting more than 73 megawatts (MW) (250 MMBtu/hr) heat input of fossil fuel (either alone or in combination with any other fuel) for which construction commenced after September 18, 1978. Subpart Da requirements were described previously in Section 2.3.

Federal NSPS also exist for industrial steam generating units (40 CFR 60 Subpart Db). The NSPS applies to all units capable of combusting more than 29 MW (100 MMBtu/hr) heat input and for which construction commenced after June 19, 1984. Subpart Db requirements were described previously in Section 2.3.

### 3.4.2 FLORIDA RULES

Several Florida emission limiting standards exist for steam generating units. Fossil fuel steam generating units with greater than 250 MMBtu/hr heat input are subject to the emission limitations of Rule 62-296.405(2), F.A.C., pertaining to PM, $SO_2$, $NO_x$, and visible emissions. Emission limitations and visible emissions requirements for carbonaceous fuel burning equipment are contained in Rule 62-296.410, F.A.C.

Fossil fuel steam generating units with less than 250 MMBtu/hr heat input are subject to the emission limitations of Rule 62-296-406, F.A.C., pertaining to PM, $SO_2$, and visible emissions. The PM and $SO_2$ standards require the application of BACT.

Florida has implemented regulations pertaining to major sources of $NO_x$ and VOC located in Palm Beach County (Rule 62-296.500, F. A. C.). These rules require the application of reasonably available control technology (RACT) to control emissions of $NO_x$ and VOC. However, these rules do not apply to pollutants at such sources for which a BACT determination has been made.

## 3.5 SOURCE APPLICABILITY

### 3.5.1 AREA CLASSIFICATION

The project site is located in Palm Beach County, which has been designated by EPA and FDEP as an attainment or maintenance area for all criteria pollutants. Palm Beach County and surrounding counties are designated as PSD Class II areas for $SO_2$, $PM_{10}$, and $NO_2$. The nearest Class I area to the site is the Everglades National Park (ENP), located about 119 km (74 miles) south of the PBPC facility.

### 3.5.2 PSD REVIEW

#### 3.5.2.1 Pollutant Applicability

The PBPC cogeneration facility will represent a modification to an existing major stationary facility. The Osceola Farms sugar mill and the PBPC facility will be considered the same facility for PSD purposes, since the two facilities are contiguous and, for PSD purposes, are deemed to operate under common control. In addition, the Osceola Farms sugar mill will be totally dependent upon the PBPC cogeneration facility for steam. Since the proposed project will be considered a modification under PSD rules, 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).

Osceola Farms operates five (5) bagasse/oil-fired steam boilers at its sugar mill. These boilers will be permanently shutdown as part of the proposed project. As a result, actual emissions from these boilers over the past two years can be used as emission offsets for the proposed PBPC project. The current actual emissions from the Osceola Farms boilers are presented in Table 3-3. The current emissions are the average emissions for calendar years 2000 and 2001. This two-year period is representative of normal facility operation (see Appendix D for derivation of emissions).

Also presented in Table 3-3 are the future potential annual emissions from the PBPC facility, based on each of the two cogeneration boilers and the package boiler operating at maximum heat input for 8,760 hr/yr (refer to Tables 2-5 and 2-6).

The net increase in emissions due to the proposed modification at the facility is also shown in Table 3-3. As shown, the net increase exceeds the PSD significant emission rates for $SO_2$, $NO_x$, Pb, fluorides and SAM. As a result, PSD review applies for these pollutants.

#### 3.5.2.2 Source Impact Analysis

A source impact analysis was performed for $SO_2$, $NO_x$, Pb, fluoride and SAM emissions resulting from the proposed modification. This analysis is presented in Sections 6.0 through 8.0. The pollutant impacts due to the proposed project are compared to the EPA Class II significant impact levels in Table 3-4. As shown the increase in impacts of $NO_x$ due to the proposed modification are below the significant impact levels. The increase in impacts due to $SO_2$ exceed the significant impact levels, and therefore a full modeling analysis is required for $SO_2$. Significant impact levels do not exist for Pb, fluorides and SAM; however, modeling for these pollutants was performed to support the additional impact analysis on soils, vegetation and wildlife.

In addition to these analyses, a source impact analysis was conducted to address potential impacts due to simultaneous operation of PBPC and the Osceola Farms sugar mill boilers. This analysis was conducted for $SO_2$, $NO_x$, $PM_{10}$, and CO.

#### 3.5.2.3 Ambient Monitoring

Based on the increase in emissions from the proposed modification (see Table 3-3), a pre-construction ambient monitoring analysis is required for $SO_2$, $NO_x$, Pb, fluorides and SAM, and monitoring data is 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 $NO_x$, Pb, and fluorides may be exempted for this project because, as shown in Table 3-4, the proposed modification's impacts are predicted to be below the applicable *de minimis* monitoring concentration for these pollutants. In addition, no acceptable air monitoring method has been established for SAM. Since the proposed project would result in predicted $SO_2$ impacts that are above the *de minimis* monitoring level, pre-construction ambient monitoring analyses is required for $SO_2$. These analyses are presented in Section 4.0.

#### 3.5.2.4 GEP Stack Height Impact Analysis

The PBPC cogeneration boiler stacks will be 199 ft high, and the package boiler stack will be 75 ft. These stack heights do not exceed the *de minimis* good engineering practice (GEP) stack height of 65 meters (213 ft), and therefore the project is in compliance with the GEP stack height rules.

### 3.5.3 EMISSION STANDARDS

#### 3.5.3.1 New Source Performance Standards

The PBPC cogeneration boilers will be subject to the NSPS for electric utility steam generating units, as contained in 40 CFR 60 Subpart Da. The NSPS applies to all electric utility steam generating units capable of combusting more than 250 MMBtu/hr heat input of fossil fuel (either alone or in combination with any other fuel). Since the PBPC cogeneration boilers will be capable of combusting fossil fuel at greater than 250 MMBtu/hr, the NSPS applies to combustion of No. 2 fuel oil, natural gas, and biomass, alone or in combination.

As described in Section 2.3, the applicable NSPS for electric utility steam generating units is 0.03 lb/MMBtu for PM and 1.2 lb/MMBtu for $SO_2$. For $NO_x$, the applicable limits are 0.20 lb/MMBtu when burning natural gas, 0.30 lb/MMBtu when burning fuel oil, and 0.60 lb/MMBtu when burning biomass. The proposed cogeneration boilers will comply with the applicable emission limits.

The PBPC package boiler will be subject to the NSPS for industrial-commercial-institutional steam generating units, as contained in 40 CFR 60 Subpart Db. The NSPS applies to all steam generating units capable of combusting more than 100 MMBtu/hr heat input of any fuel. Since the package boiler will be capable of combusting more than 100 MMBtu/hr, the NSPS applies to combustion of natural gas and No. 2 fuel oil either alone or in combination.

#### 3.5.3.2 State of Florida Standards

The applicable state of Florida emission limits for new fossil fuel steam generators with more than 250 MMBtu/hr heat input are the same as the applicable NSPS. For the cogeneration boilers, the applicable NSPS is 40 CFR 60 Subpart Da, as described in Section 2.3. For carbonaceous fuel burning units, the Florida standards are no more stringent than the NSPS. Therefore, the cogeneration boilers will comply with the Florida emission standards contained in Rules 62-296.405(2) and 62-296.410(2)(b)1, F.A.C.

The applicable State of Florida emission limits for new or existing fossil fuel steam generators with less than 250 MMBtu/hr are BACT for PM and $SO_2$ and are the same as the applicable NSPS for opacity. A BACT determination for PM and $SO_2$ for the package boiler is presented in Section 5.0. The applicable NSPS is 40 CFR 60 Subpart Db, as described in Section 2.3. The package boiler will comply with the Florida emission standards contained in Rule 62-296.406 and 62-296.410(2)(b)1, F.A.C.

As described in Section 3.4.2, Florida has implemented regulations pertaining to the application of RACT to control emissions of $NO_x$ and VOC from major sources located in Palm Beach County. However, these rules do not apply to pollutants at such sources for which a BACT determination has been made. As described in Section 3.5.2.1, $NO_x$ emissions are subject to PSD review and therefore must undergo a BACT evaluation for the proposed PBPC project. Therefore, $NO_x$ emissions are exempt from a RACT determination. However, VOC emissions are subject to RACT for the project. RACT for VOC is addressed in Section 5.0.

As discussed in Section 2.3, the applicable NSPS for industrial steam generating units is 0.20 lb/MMBtu for $NO_x$ when burning No. 2 fuel oil or natural gas and 0.80 lb/MMBtu for $SO_2$ when burning fuel oil. The proposed package boiler will comply with the applicable emission limits.

Table 3-1. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels ($\mu g/m^3$)

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

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 $\mu g/m^3$ (3-year average of 98th percentile) and an annual standard of 15 $\mu g/m^3$ (3-year average at community monitors). Implementation of these standards are many years away. The ozone standard was modified to be 0.08 ppm for 8-hour average; achieved when 3-year average of 99th percentile is 0.08 ppm or less. FDEP has not yet adopted 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 $\mu g/m^3$ 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 | Regulated Under | Significant Emission Rate (TPY) | De Minimis Monitoring Concentration[a] ($\mu g/m^3$) |
|---|---|---|---|
| Sulfur Dioxide | NAAQS, NSPS | 40 | 13, 24-hour |
| Particulate Matter [PM(TSP)] | NSPS | 25 | NA |
| Particulate Matter ($PM_{10}$) | NAAQS | 15 | 10, 24-hour |
| Nitrogen Dioxide | NAAQS, NSPS | 40 | 14, annual |
| Carbon Monoxide | NAAQS, NSPS | 100 | 575, 8-hour |
| Volatile Organic Compounds (Ozone) | NAAQS, NSPS | 40 | 100 TPY[b] |
| Lead | NAAQS | 0.6 | 0.1, 3-month |
| Sulfuric Acid Mist | NSPS | 7 | NM |
| Total Fluorides | NSPS | 3 | 0.25, 24-hour |
| Total Reduced Sulfur | NSPS | 10 | 10, 1-hour |
| Reduced Sulfur Compounds | NSPS | 10 | 10, 1-hour |
| Hydrogen Sulfide | NSPS | 10 | 0.2, 1-hour |
| Mercury | NESHAP | 0.1 | 0.25, 24-hour |
| Asbestos | NESHAP | 0.007 | NM |
| Vinyl Chloride | NESHAP | 1 | 15, 24-hour |
| MWC Organics | NSPS | $3.5 \times 10^{-6}$ | NM |
| MWC Metals | NSPS | 15 | NM |
| MWC Acid Gases | NSPS | 40 | NM |
| MSW Landfill Gases | NSPS | 50 | NM |

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

NA = Not applicable.
NAAQS = National Ambient Air Quality Standards.
NM = No ambient measurement method established; therefore, no *de minimis* concentration has been established.
NSPS = New Source Performance Standards.
NESHAP = National Emission Standards for Hazardous Air Pollutants.
$\mu g/m^3$ = 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 monitoring analysis for ozone.

Sources: 40 CFR 52.21.
Rule 62-212.400

Table 3-3. PSD Source Applicability Analysis, Palm Beach Power Corp.

| Regulated Pollutant | Current Actual Emissions From Osceola Farms[a] (TPY) | Future Potential Emissions (TPY) | | | | Net Change In Emissions Due to Proposed Project (TPY) | PSD Significant Emission Rate (TPY) | PSD Review Triggered? |
|---|---|---|---|---|---|---|---|---|
| | | Boiler No. 1 | Boiler No. 2 | Package Boiler | Fugitive Emissions[b] | | | |
| Particulate (TSP) | 301.43 | 99.87 | 99.87 | 28.31 | 7.77 | -65.61 | 25 | No |
| Particulate ($PM_{10}$) | 256.30 | 99.87 | 99.87 | 28.31 | 2.53 | -25.72 | 15 | No |
| Sulfur Dioxide | 168.66 | 199.74 | 199.74 | 51.07 | -- | 281.89 | 40 | Yes |
| Nitrogen Oxides | 299.19 | 499.35 | 499.35 | 106.17 | -- | 805.68 | 40 | Yes |
| Carbon Monoxide | 7,569.92 | 1,165.15 | 1,165.15 | 97.32 | -- | -5,142.30 | 100 | No |
| VOC | 510.90 | 199.74 | 199.74 | 27.73 | -- | -83.69 | 40 | No |
| Mercury | 0.015 | 0.018 | 0.018 | 0.003 | -- | 0.02 | 0.1 | No |
| Fluorides | 0.810 | 2.33 | 2.33 | 0.0 | -- | 3.85 | 3 | Yes |
| Lead | 0.047 | 0.50 | 0.50 | 0.01 | -- | 0.96 | 0.6 | Yes |
| Sulfuric Acid Mist | 10.328 | 12.23 | 12.23 | 2.27 | -- | 16.41 | 7 | Yes |

[a] Actual emissions based on the average emissions for 2000 and 2001.

[b] See Table 2-6 for fugitive emissions calculations. Includes fly ash silo emissions.

TSP = Total Suspended Particles
$PM_{10}$ = Particulate Matter with aerodynamic diameter less than or equal to 10 microns
VOC = Volatile Organic Compounds

Table 3-4. Increase in Impacts Due to Proposed Project Compared to Class II Significant Impact Levels and Ambient Monitoring *De Minimis* Levels

| Pollutant | Averaging Time | Maximum Concentration[a] ($ug/m^3$) | EPA Class II Significant Impact Levels ($ug/m^3$) | *De Minimis* Monitoring Concentration ($ug/m^3$) | Ambient Monitoring Review Applies? |
|---|---|---|---|---|---|
| Sulfur Dioxide | Annual | 0.143 | 1 | NA | NA |
| | 24-hour (crop season) | 9.3 | 5 | 13 | No |
| | 24-hour (off-season) | 18.7 | 5 | 13 | Yes |
| | 3-hour (crop season) | 80.3 | 25 | NA | NA |
| | 3-hour (off-season) | 85.9 | 25 | NA | NA |
| Nitrogen Oxides | Annual | 0.50 | 1 | 14 | No |
| Fluorides | 24-hour | 0.062 | NA | 0.25 | No |
| Lead | 3-month[b] | 0.0011 | NA | 0.1 | No |

[a] Highest concentration from significant impact analysis (see Section 6.0).

[b] 3-month average impact was calculated from the predicted annual impact by applying a factor of 1.32.

Note: NA = Not Applicable, No standard exists.

# 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 new major facility, the affected pollutants are those that the facility potentially would emit in significant amounts. 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 3.0, only $SO_2$, $NO_x$, Pb, fluorides and SAM require an ambient air quality analysis to meet PSD pre-construction monitoring requirements for the proposed PBPC cogeneration facility project.

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 proposed 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 preconstruction 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. As described in Section 3.5.2.3, $NO_x$, Pb, fluorides and SAM can be exempted from the ambient monitoring requirements. However, $SO_2$ requires a preconstruction ambient monitoring analysis. This analysis is presented in the following section.

The PSD ambient monitoring guidelines allow the use of existing data to satisfy preconstruction review requirements and to develop background concentrations. Background concentrations are necessary to determine total ambient air quality impacts to demonstrate compliance with AAQS. "Background concentrations" are defined as concentrations due to sources other than those specifically included in the modeling analysis. For all pollutants, background would include other point sources not included in the modeling (i.e., faraway sources or small sources), fugitive emission sources, and natural background sources. Background concentrations for $SO_2$, $NO_x$, $PM_{10}$, and CO

are presented in this section to support the air impact analysis. In addition, existing ambient air quality data for the Everglades National Park Class I area is presented to support the AQRV analysis presented in Section 8.0.

## 4.2 $SO_2$ AMBIENT BACKGROUND CONCENTRATIONS

A summary of existing continuous ambient $SO_2$ data for monitors located closest to the PBPC site is presented in Table 4-1. As shown, the two closest monitors were located in South Bay and in Riviera Beach. Data are presented for 1997 for the South Bay station and 1999-2000 for Riviera Beach. The station located in South Bay operated in 1997 but was shutdown in 1998.

The monitor in Riviera Beach is not considered to be representative of the PBPC site due to the distance this monitor is from the site, and its urban location near a major power plant. The South Bay monitor is considered representative of the PBPC site area, since it is located in a similar rural setting in western Palm Beach County.

The monitor at South Bay shows that ambient $SO_2$ concentrations were well below the ambient air quality standards 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 annual average $SO_2$ concentration of 5 $\mu g/m^3$ recorded at the South Bay monitor during 1997 was selected. Similarly, the concentrations used for the 3- and 24-hour background $SO_2$ concentrations in the air quality impact analysis were 47 and 13 $\mu g/m^3$, respectively, which are the second highest concentrations measured at the site.

## 4.3 CO AMBIENT BACKGROUND CONCENTRATIONS

A summary of existing continuous ambient CO data for monitors located nearest to the PBPC site is presented in Table 4-2. Data are presented for the last two years of record, 1999 to 2000. As shown, the nearest CO monitoring stations were located in West Palm Beach.

The CO monitors show that ambient CO concentrations were well below the ambient air quality standards of: 35 ppm (40,000 $\mu g/m^3$), maximum 1-hour average; and 9 ppm (10,000 $\mu g/m^3$) maximum 8-hour average. For purposes of an ambient CO background concentration for use in the modeling analysis, the second-highest 1-hour CO concentration of 4,600 $\mu g/m^3$ and the second-highest 8-hour concentration of 3,220 $\mu g/m^3$, recorded at the Belvedere Road monitor in West Palm

Beach during 1999 were selected. Although lower in magnitude than the South Military Trail monitor, the Belvedere Road monitor is considered to provide a very conservative estimate of background CO concentrations for the PBPC project, due to the significant mobile traffic impacting both the West Palm Beach monitors.

## 4.4 $PM_{10}$ AMBIENT BACKGROUND CONCENTRATIONS

A summary of existing ambient $PM_{10}$ data for the monitor located closest to the PBPC site is presented in Table 4-3. As shown, the closest monitor was located in Belle Glade. Data are presented for the last two years of record, 1999 to 2000. The Belle Glade monitor is considered representative of the PBPC site area, since it is located in a similar rural setting in Belle Glade.

The monitor at Belle Glade shows that ambient $PM_{10}$ concentrations were well below the ambient air quality standards of 150 $\mu g/m^3$, maximum 24-hour average, and 50 $\mu g/m^3$, annual average. For purposes of an ambient $PM_{10}$ background concentration for use in the modeling analysis, the annual average concentration of 19 $\mu g/m^3$ recorded in 1999 was selected. Similarly, the concentration used for the 24-hour background concentration in the air quality impact analysis was 36 $\mu g/m^3$, which is the second-highest concentration measured at the site in either year.

## 4.5 $NO_2$ AMBIENT BACKGROUND CONCENTRATIONS

A summary of existing continuous ambient $NO_2$ data for the monitor located nearest to the PBPC site is presented in Table 4-4. Data are presented for the last two years of record, 1999 to 2000. As shown, the nearest $NO_2$ monitoring station was located in West Palm Beach.

The monitor shows that ambient $NO_2$ concentrations were well below the ambient air quality standard of 100 $\mu g/m^3$, annual average. The highest annual average concentration recorded during either year was 30 $\mu g/m^3$. This value was used for purposes of the ambient $NO_2$ background concentration for use in the modeling analysis. The monitor in West Palm Beach is considered to provide a very conservative estimate of background $NO_2$ concentrations for the PBPC project, due to the significant mobile traffic and point sources impacting the West Palm Beach monitor.

## 4.6 EVERGLADES NATIONAL PARK CLASS I AREA

A summary of existing ambient $PM/PM_{10}$, $SO_2$, and $NO_2$ monitoring data for monitors located in the vicinity of the Everglades National Park Class I area is presented in Table 4-5. One $SO_2$ monitor was

located directly in the Everglades National Park in 1997 and 1998. The nearest $NO_2$ data are from sites located in Miami.

The monitoring data show that ambient $PM_{10}$ and $NO_2$ concentrations were well below the ambient air quality standard and ambient $SO_2$ concentrations were extremely low and are representative of natural background concentrations.

Table 4-1. Summary of Continuous Sulfur Dioxide Ambient Monitoring Data Collected Near PBPC Site

| County | Site ID No. | Location | Year | Number of Observations | Percent of Data Recovery | Concentration | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max 3-hour | | 2nd High 3-hour | | Max 24-hour | | 2nd High 24-hour | | Annual Average | |
| | | | | | | ppm | ug/m3 | ppm | ug/m3 | ppm | ug/m3 | ppm | ug/m3 | ppm | ug/m3 |
| Palm Beach | 4150-001-J02 | South Bay-300 North US 27 | 1997 | 8,486 | 97% | -- | 55 | -- | 47 | -- | 19 | -- | 13 | -- | 5 |
| Palm Beach | 12-099-3004 | Riviera Beach- 1050 15th St. | 1999 | 8,221 | 94% | 0.017 | 45 | 0.014 | 37 | 0.013 | 34 | 0.013 | 34 | 0.002 | 5 |
| | | | 2000 | 8,404 | 96% | 0.013 | 34 | 0.012 | 31 | 0.010 | 26 | 0.008 | 21 | 0.002 | 5 |

Note: ug/m3 = micrograms per cubic meter
ppm = parts per million
Source: FDEP Allsum Report; 1999, 2000.

Table 4-2. Summary of Continuous Ambient Carbon Monoxide Data Collected Near the PBPC Site

| City | Site ID No. | Location | Year | Number of Observations | Percent of Data Recovery | Concentration | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Max 1-hour | | 2nd High 1-hour | | Max 8-hour | | 2nd High 8-hour | |
| | | | | | | ppm | ug/m3 | ppm | ug/m3 | ppm | ug/m3 | ppm | ug/m3 |
| Palm Beach | 12-099-1004 | 3700 Belvedere Road | 1999 | 8,355 | 95 | 4.2 | 4,830 | 4.0 | 4,600 | 3.3 | 3,795 | 2.8 | 3,220 |
| | | | 2000 | 8,631 | 99 | 3.8 | 4,370 | 3.8 | 4,370 | 2.7 | 3,105 | 2.6 | 2,990 |
| West Palm Beach | 12-099-1006 | 50 S. Military Trail | 1999 | 8,523 | 97 | 5.5 | 6,325 | 5.2 | 5,980 | 3.9 | 4,485 | 3.1 | 3,565 |
| | | | 2000 | 7,110 | 81 | 6.6 | 7,590 | 4.9 | 5,635 | 2.9 | 3,335 | 2.7 | 3,105 |

Note: ug/m3 = micrograms per cubic meter
ppm = parts per million
Source: FDEP Allsum Report; 1999, 2000.

Table 4-3. Summary of $PM_{10}$ Ambient Monitoring Data Collected Near PBPC Site

| County | Site ID No. | Location | Year | Number of Observations | Concentration (ug/m$^3$) Maximum 24-hour | 2nd High 24-hour | Annual Average |
|---|---|---|---|---|---|---|---|
| Palm Beach | 12-099-0008 | Belle Glade- 38754 S. R. 80 | 1999 | 55 | 33 | 31 | 19 |
| | | | 2000 | 54 | 44 | 36 | 19 |

Note: ug/m3 = micrograms per cubic meter

Source: FDEP Allsum Report; 1999, 2000.

Table 4-4. Summary of Continuous Ambient Nitrogen Dioxide Data Collected Near the PBPC Site

| City | Site ID No. | Location | Year | Number of Observations | Percent of Data Recovery | Annual Average Concentration | |
|---|---|---|---|---|---|---|---|
| | | | | | | ppm | ug/m3 |
| Palm Beach | 12-099-1004 | 3700 Belvedere Road | 1999 | 8,307 | 95 | 0.013 | 24 |
| | | | 2000 | 8,553 | 98 | 0.016 | 30 |

Note: ug/m3 = micrograms per cubic meter
ppm = parts per million
Source: FDEP Allsum Report; 1999, 2000.

Table 4-5. Summary of Sulfur Dioxide, $PM_{10}$, and $NO_x$ Monitoring Data Collected in or Near the Everglades National Park

| Year | County | Station ID | Monitor Location | Number of Observations | Concentration ($ug/m^3$) Maximum 24-Hour | 2nd High 24-Hour | Annual Average |
|---|---|---|---|---|---|---|---|
| $SO_2$ Monitoring Data | | | | | | | |
| 1997 | Dade | National Park Service | Within Everglades National Park | 94 | 0.52 | 0.18 | 0.044 |
| 1998 | Dade | National Park Service | Within Everglades National Park | 66 | 0.72 | 0.68 | 0.13 |
| $PM_{10}$ Monitoring Data | | | | | | | |
| 1990 | Dade | National Park Service | Within Everglades National Park | 89 | 79 | 44 | 20 |
| 1991 | Dade | National Park Service | Within Everglades National Park | 53 | 38 | 37 | 18 |
| $NO_x$ Monitoring Data | | | | | | | |
| 1999 | Dade | 12-025-0027 | Miami- Rosensteil School | 7,916 | NA | NA | 11 |
| | Dade | 12-025-4002 | Miami- 864 NW 3rd Street | 8,340 | NA | NA | 32 |
| 2000 | Dade | 12-025-0027 | Miami- Rosensteil School | 6,861 | NA | NA | 11 |
| | Dade | 12-025-4002 | Miami- 864 NW 3rd Street | 6,805 | NA | NA | 30 |

Note: $ug/m^3$ = micrograms per cubic meter

# 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. 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 PBPC project, $SO_2$, $NO_x$, Pb, fluorides and SAM require a BACT analysis. A BACT analysis is also required for PM for the package boiler by Rule 62-296.406(2), F.A.C. The BACT analysis is presented in the following sections.

## 5.2 COGENERATION BOILERS

### 5.2.1 SULFUR DIOXIDE

#### 5.2.1.1 Proposed Control Technology

$SO_2$ emissions will be controlled by burning biomass, low sulfur No. 2 distillate fuel oil (0.05 percent sulfur, maximum) and natural gas. All of these fuels are inherently very low in sulfur, and therefore produce low $SO_2$ emissions. The following table summarizes the expected biomass fuel sulfur content, based on actual fuel sampling at Okeelanta cogeneration facility.

| Wood, % by wt. dry | Bagasse, % by wt. dry |
|---|---|
| 0.02%, low | 0.02%, low |
| 0.07%, avg. | 0.03%, avg. |
| 0.27%, high | 0.05%, high |

PBPC will utilize generally the same wood fuel sources as the Okeelanta facility.

In addition, $SO_2$ removal is inherent to the process of combusting biomass. The fly ash produced during biomass firing is alkaline in nature and acts as a dry scrubbant, adsorbing $SO_2$ from the exhaust stream. The ash is then collected in the mechanical collectors and the ESP. Significant $SO_2$ removal has been demonstrated at the Okeelanta cogeneration facility, which is identical in design to the proposed PBPC facility. Based on fuel analysis and CEM data, daily $SO_2$ removal efficiencies at Okeelanta cogeneration were estimated to range from 87 to 99 percent.

The proposed BACT emission limits for $SO_2$ for biomass firing are:

- 0.20 lb/MMBtu on a 24-hour average;
- 0.10 lb/MMBtu on a 30-day rolling average, and;
- 0.06 lb/MMBtu on a 12-month rolling average.

For fuel oil firing, the proposed BACT is burning low sulfur distillate oil with a maximum sulfur content of 0.05 percent. This is equivalent to $SO_2$ emissions of approximately 0.05 lb/MMBtu. No limit is proposed for natural gas firing; however, estimated $SO_2$ emissions are 0.006 lb/MMBtu. It is noted that these are the same limits recently determined to be BACT for the Okeelanta cogeneration facility, a facility identical in design to the proposed PBPC facility.

#### 5.2.1.2 BACT ANALYSIS

A review was performed of previous $SO_2$ BACT determinations for similar biomass-fired boilers listed in the RACT/BACT/LAER Clearinghouse on EPA's web page. Also, FDEP provided a listing of BACT determinations for wood-fired boilers in the Okeelanta cogeneration draft PSD permit. From this information, BACT determinations issued within the last 10 years (i.e., since 1992) were identified. A summary of these BACT determinations for biomass-fired boilers is presented in Table 5-1. Note that one fluidized bed biomass boiler located in California (SAI Energy, Inc.) was not included in the table because of the distinct differences between PBPC's proposed spreader stoker boilers and a fluidized bed boiler.

Previous BACT determinations have ranged from 0.016 to 0.17 lb/MMBtu of $SO_2$ emissions. Three of these determinations were for bagasse-fired boilers. Bagasse is a fuel that exhibits lower and less variable sulfur content than wood. Four projects were located at paper mills, which predominantly

obtain biomass from dedicated forests, with a consistent fuel quality. It is noted that the Grayling Generating Station determination listed is likely not a BACT determination, because total $SO_2$ emissions from the plant were less than 40 TPY. However, it was provided due to the recent issuance of this permit and its similarity to the PBPC project.

From the review of these previous BACT determinations, it is evident that $SO_2$ BACT determinations for biomass-fired boilers have been based solely on fuel specifications (i.e., use of low sulfur-containing fuels). Therefore, the emission limits are based on the prospective or actual fuel supply. It is noted that the proposed PBPC facility is believed to be significantly different than the wood/bark burning facilities shown in Table 5-1. PBPC will obtain its wood materials from a number of suppliers and sources throughout south Florida. None of the sources shown in Table 5-1 are located in south Florida, and many are believed to have a dedicated fuel supply source, which means that the fuel is much more homogenous than PBPC's fuel supply. Nevertheless, the BACT emission limits have been based on the fuel supply for the specific project. The proposed BACT for PBPC is based on actual fuel supply for the Okeelanta cogeneration facility.

Technically feasible $SO_2$ control alternatives for the PBPC boilers consist of add-on $SO_2$ control systems. EPA has performed a recent review of $SO_2$ control technologies as it applies to the electric power industry (EPA, 2000). Current flue gas desulfurization (FGD) technologies identified include wet FGD, dry FGD and regenerable FGD. Wet FGD includes technologies such as lime, limestone forced or inhibited oxidation, and magnesium-enhanced lime FGD. These systems create solid and liquid waste streams, which must be treated before disposal.

Dry FGD systems include lime spray drying, dry lime furnace injection, and dry lime duct injection. These systems must be followed by a highly efficient PM control device, which is typically a fabric filter, although an electrostatic precipitator could also be used.

Regenerable FGD systems can be either wet or dry and result in a concentrated stream of $SO_2$, which can then be sold. These systems include sodium sulfite, magnesium oxide, sodium carbonate and amine.

Wet FGD systems dominate throughout both the world and the U. S, with wet limestone being the dominant wet FGD technique. The dominant dry FGD technique is spray drying. $SO_2$ control

efficiencies for wet limestone FGD ranges from 50 to 98 percent, depending on type of device and design, with an average of 90 percent. Lime spray drying efficiency ranges from 70 to 96 percent, with an average of 90 percent.

To evaluate the cost effectiveness of FGD applied to the proposed PBPC, cost estimates for a lime spray drying system were developed. Spray drying systems are generally less expensive than the wet limestone FGD process. To develop the costs, the Coal Utility Environmental Cost (CUECost) program was used (EPA, 2001). This program is stated to produce rough order of magnitude costs (± 30% accuracy). Default values for input parameters, contained in the program, were used in most cases. Fuel specifications were input to reflect biomass fuel characteristics to the extent possible. Fuel heating value and sulfur content were specified to result in uncontrolled $SO_2$ emissions of 0.06 lb/MMBtu, which is the proposed annual average limit for PBPC. Control equipment information specific to PBPC was input to the program. $SO_2$ removal was specified as 90 percent. Capital recovery costs were based on 7% interest and a 20-year equipment life.

The CUECost program accepts a minimum plant size of not less than 100 MWe. Therefore, the cost estimates on a $/kW basis were used to adjust the costs to a 74 MWe facility size. The estimated costs should provide a close estimate of actual costs for the control technologies. Refer to Appendix E for a listing of input and output values for the CUECost program.

Based on the CUECost program, a lime spray dryer system for the PBPC facility is estimated to result in capital costs of $412/kW, or $31 million for a 75 MW plant. Based on a 20-year life, the annual fixed charges in current dollars is $53.6/kW/yr, or $4.0 million per year. Total operating and maintenance costs were estimated at $41/kW/yr, or $3.1 million per year in annual operating costs. Total annualized costs for a lime spray dryer system, therefore, are estimated to be $7.2 million per year. Based on an uncontrolled emission rate of 0.06 lb/MMBtu, equivalent to 400 tons per year $SO_2$, the total $SO_2$ removed is 360 TPY. The cost effectiveness for lime spray drying is therefore $20,000 per ton of $SO_2$ removed. Even if it were hypothetically assumed that a lower cost lime spray drying system could be obtained at a total annual cost of $3.6 million per year, the cost effectiveness would still be $10,000 per ton.

#### 5.2.1.3 Summary

In conclusion, PBPC's request for $SO_2$ emissions standards is reasonable based on the available information from the Okeelanta cogeneration facility, the low sulfur content of biomass fuels, and BACTs for other biomass power plants. The $SO_2$ emissions are a direct function of the fuel sulfur content, but are difficult to minimize on a short-term basis because of fuel sulfur variation and the unquantified $SO_2$ removal mechanism. The uncontrolled $SO_2$ emissions from biomass, No. 2 fuel oil and natural gas are very low, which renders any add-on control equipment as too costly. Further, there is inherent $SO_2$ removal in the boiler/PM control system, based on Okeelanta's operating and emissions data.

The retrofit of add-on flue gas desulfurization equipment is not appropriate for the existing units nor the requested re-permitting of the PBPC facility. Each of the alternative $SO_2$ control systems would result in significant capital and operating costs for PBPC. The cogeneration boilers and control equipment PBPC proposes to utilize are already in place, but sitting idle, at the proposed site. The two cogeneration boilers would need to be "retrofitted" with these systems, substantially increasing costs. The cost effectiveness of an add-on lime spray drying system is estimated to be greater than $10,000 per ton of $SO_2$ removed.

Therefore, the following BACT standards are proposed based on the firing of low sulfur fuels.

- 24-hour $SO_2$ standard of 0.20 lb/MMBtu when firing any authorized fuel.
- 30-day rolling $SO_2$ standard of 0.10 lb/MMBtu when firing any authorized fuel. This is consistent with the 30-day averaging period specified in NSPS Subpart Da and represents a much lower limit than the NSPS (0.60 lb/MMBtu for solid fuel and 0.20 lb/MMBtu for gas and oil firing).
- Annual average $SO_2$ standard of 0.06 lb/MMBtu based on a 12-month rolling average when firing any fuel.

In summary, the proposed BACT for the PBPC cogeneration boilers is the continued use of very low sulfur fuels, i.e., biomass, No. 2 fuel oil, and natural gas.

### 5.2.2 NITROGEN OXIDES

#### 5.2.2.1 Proposed Control Technology

The existing cogeneration boilers that the PBPC cogeneration facility will utilize employ a selective non-catalytic reduction (SNCR) system to reduce $NO_x$ emissions. SNCR is a system that injects urea into the boiler to reduce $NO_x$ emissions. In this process, urea is injected into the flue gas stream and reacts with $NO_x$ to form nitrogen and water vapor. For the PBPC cogeneration boilers, urea will be injected into each boiler at a maximum rate of 65 gallons per hour (gph).

The proposed BACT emission limit for $NO_x$ is 0.15 lb/MMBtu based on a 30-day rolling average for biomass, No. 2 fuel oil, and natural gas. This is the BACT emission rate determined for the similar Okeelanta cogeneration facility. For each boiler, this limit is equivalent to 499.4 TPY of $NO_x$.

#### 5.2.2.2 BACT Analysis

A review was performed of previous $NO_x$ BACT determinations for similar biomass-fired boilers listed in the RACT/BACT/LAER Clearinghouse on EPA's web page. From this information, BACT determinations issued within the last 10 years (i.e., since 1992) were identified. A summary of the BACT determinations for biomass-fired boilers from this review is presented in Table 5-2. Note that one fluidized bed biomass boiler located in California (SAI Energy, Inc.) was not included in the table because of the distinct differences between PBPC's proposed spreader stoker boilers and a fluidized bed boiler.

Aside from one exception, previous BACT determinations for $NO_x$ have ranged from 0.15 to 0.46 lb/MMBtu. The one exception is a limit of 0.10 lb/MMBtu limit for Multitrade Limited Partnership in Virginia. The Multitrade limit was issued nearly 10 years ago. Aside from this determination, the lowest BACT limit set for $NO_x$ has been 0.15 lb/MMBtu, equivalent to PBPC's proposed BACT limit. It is noted that the most recent determination for Grayling Generating Station (Michigan) also resulted in a BACT limit of 0.15 lb/MMBtu.

From the review of these previous BACT determinations, it is evident that $NO_x$ BACT determinations for biomass-fired boilers have been based solely on combustion controls alone, or combustion controls with SNCR.

The only technically feasible $NO_x$ control alternatives for the PBPC cogeneration boilers consists of the proposed SNCR system and selective catalytic reduction (SCR) control systems.

SCR is an add-on technology in which ammonia is injected into the exhaust gas stream in the presence of a catalyst. The ammonia combines with $NO_x$ in the gas stream in a reduction reaction, forming nitrogen and water. For the reaction to proceed satisfactorily, the exhaust gas temperature must be maintained between 450°F and 850°F. SCR systems are stated to achieve from 70 to 90 percent $NO_x$ reduction.

Although SCR is commercially available, this technology has never been applied to a bagasse boiler. As shown in Table 5-2, SCR has never been specified as BACT for a biomass-fired boiler. In a paper presented at the 2001 AWMA Annual Conference on Orlando, it was reported that there are now ten coal-fired plants in the U.S. that employ SCR. In addition, there were an estimated 40 additional plants with SCR units either under construction or in the procurement process (A. Johnson and C. Lockert, 2002). Weaknesses in these conventional SCR units were reported to include lag time of feedback $NO_x$ signal from the stack CEM, and system response to step changes in $NO_x$ concentrations. Other issues include air heater fouling, catalyst poisoning, stack opacity, and flyash contamination.

Technical difficulties associated with applying SCR to PBPC's proposed wood/bagasse-fired boilers include no operating experience on bagasse or wood of the type PBPC will utilize. Catalyst deactivation over a short period could occur in the presence of bagasse/wood ashes, due to catalyst pore plugging, chemical poisoning of the catalyst due to the alkali content of the ash, and/or reaction of the ash with gaseous components in the flue gas to blind the catalyst. The high moisture content of wood fuels, and particularly bagasse (approx. 50-percent moisture), could also be a concern for catalyst operation. High particulate loading prior to the mechanical collectors would also be a concern. This could lead to catalyst fouling and reduced $NO_x$ removal efficiency.

Moreover, the $NO_x$ reduction efficiency obtainable with an SCR system applied to a wood/bagasse boiler is uncertain, again due to lack of operating experience. SCR systems generally achieve from 70 to 90 percent $NO_x$ reduction. However, for the PBPC cogeneration boilers, the actual reduction could be less and approach that of the SNCR system efficiency. The SNCR system has been proven

to operate satisfactorily on boilers identical to PBPC and burning the same fuels, i.e., at the Okeelanta cogeneration facility.

In addition to these concerns, the cost of an SCR system for PBPC's cogeneration boilers would be many times higher than the proposed SNCR system, and would require use of a hazardous chemical (ammonia instead of urea).

#### 5.2.2.3 Summary

Aside from one exception, previous BACT determinations for $NO_x$ from biomass-fired boilers have ranged from 0.15 to 0.46 lb/MMBtu. This includes the most recent determination for Grayling Generating Station, which resulted in a BACT limit of 0.15 lb/MMBtu. Previous $NO_x$ BACT determinations for biomass-fired boilers have been based solely on combustion controls alone, or combustion controls with SNCR.

The only technically feasible $NO_x$ control alternatives for the PBPC cogeneration boilers consist of the proposed SNCR system and SCR control systems. However, SCR has not been applied to a bagasse boiler, or to a wood-fired boiler burning PBPC's type of fuels. A number of technical issues may need to be resolved before SCR could be successfully applied to PBPC's cogeneration boilers. In addition, the achievable $NO_x$ reduction efficiency obtainable with an SCR system applied to a wood/bagasse boiler is uncertain. SCR systems generally achieve from 70 to 90-percent $NO_x$ reduction. However, for the PBPC cogeneration boilers, the actual reduction could be less, and approach that of the SNCR system efficiency. The SNCR system has been proven to operate satisfactorily on boilers identical to PBPC and burning the same fuels. In addition, the cost of an SCR system for PBPC's cogeneration boilers would be many times higher than the proposed SNCR system, and would require use of a hazardous chemical (ammonia instead of urea).

Therefore, the proposed $NO_x$ BACT standard for PBPC is based on the SNCR system and operating experience at Okeelanta cogeneration facility: 30-day rolling $NO_x$ standard of 0.15 lb/MMBtu when firing any authorized fuel. This is consistent with the 30-day averaging period specified in NSPS Subpart Da and represents a much lower limit than the NSPS (0.60 lb/MMBtu for solid fuel and 0.20 lb/MMBtu for gas and oil firing).

Use of the SNCR system and good combustion practices constitute BACT for the proposed PBPC cogeneration boilers.

### 5.2.3 FLUORIDES

#### 5.2.3.1 Proposed Control Technology

The proposed control technology for fluorides for the PBPC cogeneration boilers is the use of biomass fuels with a mechanical collector and an ESP for PM control. The fuels burned in the PBPC cogeneration boilers may contain trace levels of F. Stack testing of both wood and bagasse fuels at Okeelanta cogeneration facility have indicated very low, although detectable, levels of F in the stack gases of the boilers. Fuel oil can also contain trace levels of F. F contained in the fuels is converted to hydrogen fluoride (HF) in the furnace. HF is an acid gas, and will behave similar to $SO_2$ in the furnace and downstream control equipment. Thus, as discussed for $SO_2$, HF will be adsorbed onto the alkaline ash particles existing in the flue gas. The ash is then removed in the downstream mechanical collectors and electrostatic precipitator, resulting in inherent F control.

#### 5.2.3.2 BACT Analysis

As part of the BACT analysis, a review of previous F BACT determinations for biomass-fired boilers listed in the RACT/BACT/LAER Clearinghouse on EPA's web page was performed. A summary of the BACT determination for biomass-fired boilers from this review is presented in Table 5-3. The sole F emission limit for a biomass-fired boiler is 1.7E-03 lb/MMBtu. By comparison, measured F emissions at Okeelanta cogeneration facility have been less than 7.0E-04 lb/MMBtu for both wood and bagasse. These represent extremely low levels of F emissions. The same control techniques identified to control $SO_2$ emissions also control F emissions.

As discussed above for $SO_2$, any of the add-on $SO_2$ control systems would result in significant capital and operating costs for PBPC. At the very small F emission levels projected for the PBPC facility (4.66 TPY), the cost effectiveness of add-on equipment would be extremely high. Therefore, the proposed BACT for F emissions is the proposed control technology of biomass fuels and PM control equipment.

### 5.2.4 SULFURIC ACID MIST

#### 5.2.4.1 Proposed Control Technology

The proposed BACT for SAM emissions is the use of low sulfur fuels. Emissions of SAM are related to $SO_2$ emissions. $SO_2$ and SAM emissions will be controlled by burning low sulfur biomass fuel and low sulfur content fuel oil. Biomass fuel, low sulfur fuel oil, and natural gas are inherently low in sulfur, and therefore produce low SAM emissions.

#### 5.2.4.2 BACT Analysis

Since emissions of SAM are related to $SO_2$ emissions, BACT for $SO_2$ also represents BACT for SAM. The proposed emission limit for SAM emissions is 0.0037 lb/MMBtu (annual average basis) for biomass firing and 0.0015 lb/MMBtu for No. 2 fuel oil. This is equivalent to a maximum of 24.4 TPY of SAM emissions for both cogeneration boilers combined.

Previous BACT determinations for SAM emissions from biomass-fired boilers are presented in Table 5-4. Combustion control is the only control method employed in these BACT determinations. Emission limits of 0.001 and 0.003 lb/MMBtu without any add-on control constitutes BACT for a previous determination. The proposed PBPC cogeneration boiler limit for SAM is consistent with these determinations.

### 5.2.5 LEAD

#### 5.2.5.1 Proposed Control Technology

The proposed BACT for Pb emissions is control by mechanical dust collectors and ESPs. Pb will be emitted in the solid phase from the proposed PBPC cogeneration boilers. Pb emissions are a function of the Pb content of the biomass fuels. Maximum Pb emissions from the two cogeneration boilers combined will be 1.0 TPY. The maximum emissions are due to biomass firing.

#### 5.2.5.2 BACT Analysis

As part of the BACT analysis, a review of previous Pb BACT determinations for biomass boilers listed in the RACT/BACT/LAER Clearinghouse on EPA's web page was performed. A summary of the BACT determinations for biomass-fired boilers from this review is presented in Table 5-5. As shown, only one determination was found. The Pb emission limit for this determination was 3.82E-05 lb/MMBtu.

The proposed emission limit for the PBPC cogeneration boilers is 1.5E-04 lb/MMBtu. This limit is based on actual stack test data from the Okeelanta cogeneration facility. This limit represents an upper limit based on the stack testing. Actual average emissions are expected to be lower than this limit. It would not be economical to install any add-on control equipment to decrease Pb emissions any further than what is achievable through burning clean fuels (i.e., biomass, natural gas, and No. 2 fuel oil with a maximum sulfur content of 0.05 percent). Therefore, clean fuels are proposed as BACT for Pb emissions.

### 5.2.6 RACT ANALYSIS FOR VOC

Florida's air rules require the application of RACT for any proposed major source of VOC to be located in Palm Beach County. PBPC is proposing a VOC limit of 0.06 lb/MMBtu to meet RACT based on the current limit for Okeelanta Cogeneration facility.

For a boiler, the only feasible RACT control technology for VOC is good combustion practices. The PBPC cogeneration boilers will be modern spreader stoker boilers with modern combustion controls. RACT is good combustion practices with a VOC limit of 0.06 lb/MMBtu.

## 5.3 PACKAGE BOILER

### 5.3.1 SULFUR DIOXIDE

The proposed BACT for $SO_2$ emissions from the package boiler is based on burning No. 2 distillate fuel oil with a sulfur content of 0.05 percent or less.

As part of the BACT analysis, a review of previous $SO_2$ BACT determinations for industrial boilers listed in the RACT/BACT/LAER Clearinghouse on EPA's webpage was performed. Summaries of BACT determinations for both fuel oil- and natural gas-fired boilers from this review are presented in Tables 5-6 and 5-7, respectively. From this review, it is evident that $SO_2$ BACT determinations for industrial boilers have typically been fuel specifications.

Since the level of $SO_2$ emissions is directly related to the amount of sulfur in the fuel, a low sulfur-containing fuel can be used to meet the $SO_2$ limitation specified by the NSPS regulations for industrial boilers. PBPC proposes to use natural gas and 0.05-percent sulfur fuel oil for the package boiler. These result in less than 60 TPY of $SO_2$ emissions. There is no other technology that could achieve lower $SO_2$ emissions. Therefore, the proposed BACT for $SO_2$ emissions is to use natural gas

and No. 2 fuel oil with a maximum sulfur content of 0.05 percent. The resulting emissions are comparable to the emissions resulting from other BACT determinations, and are consistent with previous BACT determinations.

### 5.3.2 PARTICULATE MATTER

Maximum PM emissions from the package boiler are estimated to be 28.31 TPY. These maximum emissions are due to fuel oil firing. PBPC proposes to use natural gas and No. 2 fuel oil with a maximum sulfur content of 0.05 percent. Both of these fuels are clean burning fuels and result in very low PM emissions.

As part of the BACT analysis, a review of previous $PM/PM_{10}$ BACT determinations for industrial boilers listed in the RACT/BACT/LAER Clearinghouse on EPA's webpage was performed. Summaries of BACT determinations for both fuel oil- and natural gas-fired boilers from this review are presented in Tables 5-8 and 5-9, respectively.

From the review of previous BACT determination, it is evident that PM BACT determinations for both oil-fired and natural gas-fired industrial boilers have typically been fuel specifications and good design and operating practices. Proposed maximum PM emissions from the package boiler are 0.032 lb/MMBtu when firing No. 2 fuel oil and 0.0019 lb/MMBtu for natural gas. The No. 2 fuel oil factor is based on previous emission test results for Okeelanta's Boiler No. 16.

There are two determinations for fuel oil fired industrial boilers; the emission limits for these determinations are 0.05 lb/MMBtu and 0.08 lb/MMBtu. The proposed BACT for the package boiler would result in emissions below this range for fuel oil firing. The emission limits from the determinations for natural gas-fired industrial boilers range from 0.002 lb/MMBtu to 0.03 lb/MMBtu. The proposed BACT for the package boiler would result in emissions at the lower end of this range for emissions due to natural gas firing.

It would not be economical to install any add-on control equipment to decrease PM emissions any further than what is achievable through burning clean fuels (i.e., natural gas and No. 2 fuel oil with a maximum sulfur content of 0.05 percent). Therefore, clean fuels are proposed as BACT for PM emissions.

### 5.3.3 NITROGEN OXIDES

#### 5.3.3.1 Identification of $NO_x$ Control Technologies for Industrial Boilers

In this section, the control technologies capable of reducing $NO_x$ emissions produced by industrial boilers will be evaluated relative to their potential application as BACT for the PBPC package boiler. All potentially applicable control technologies for stationary external combustion boilers are reviewed. The technologies can be separated into two major groups:

1. Reducing pollutant emissions by boiler modification (i.e., low excess air burner design), and
2. Converting $NO_x$ in the exhaust gas by add-on flue gas treatment devices.

The discussion of each potential $NO_x$ control technology includes a description of the technology and the potential $NO_x$ emission reduction if the technology is concluded to be technically feasible.

**Technologies Involving Boiler Modification**

Stationary source $NO_x$ emission control technologies originally were developed for use on large, field-erected electric utility boilers since these boilers are the major source of $NO_x$ emissions. As the $NO_x$ control technologies progress and improve, their applications also are extended to smaller industrial and commercial boilers of less than 500 MMBtu/hr heat input. For the PBPC package boiler, the following boiler modification techniques for controlling $NO_x$ formation are applicable: low excess air (LEA) combustion process, low nitrogen oxides ($NO_x$) burner design, and flue gas recirculation.

***Low Excess Air Combustion Process***

Formation of $NO_x$ in combustion processes is a result of both oxidation of fuel-bound nitrogen and thermal oxidation of molecular nitrogen in the incoming air. The latter oxidation process occurs at a higher temperature condition than the standard fuel-combustion process. Typically, thermal oxidation accounts for more than 50 percent of $NO_x$ formation in an oil-fired combustion process since the concentration of fuel-bound nitrogen is so small. The principal mechanism of $NO_x$ formation from natural gas combustion is also thermal oxidation. Thus, controlling the amount of excess air will have a significant effect on the $NO_x$ thermal oxidation process.

A low excess air (LEA) combustion process can be achieved either by an oxygen sensor and control feedback process or by the burner design. In standard boilers, reduction of the excess air level usually is accomplished by installing a flue gas oxygen sensory unit that provides feedback to an inlet

air automatic controller that regulates the excess air at the desired level. The LEA combustion process, by modifying the boiler inlet air condition, can achieve a maximum of 25 percent $NO_x$ reduction.

In modern boilers, the LEA combustion process is engineered as an integral part of the burner design, which allows a minimum air-to-fuel ratio in the thermal combustion zone. The LEA burner design can achieve better excess air reduction than the LEA system with a flue gas oxygen sensor and control feedback mechanism.

***Low $NO_x$ Burner Design***

Low $NO_x$ burner design can directly incorporate advanced and higher efficiency combustion techniques that result in low $NO_x$ formation. There are two standard low $NO_x$ burner designs: LEA (single-staging) burners and multi-staging combustion burners.

The LEA (single-staging) burners are designed to operate at the lowest level of excess air by way of an efficient combustion process supported by an optimal air-to-fuel mixture. Compared to the operation of conventional burners (in the range of 3 to 6 percent of flue gas oxygen concentration), the LEA burners are capable of operating at stack gas oxygen concentrations of 0.5 to 1.5 percent. LEA burners were reported to achieve 45-percent reduction in $NO_x$ formation over the conventional burner when burning distillate oil. LEA burners typically are applied in single-burner systems because of the difficulty in maintaining equal air distribution in multiple-burner systems.

The multi-staging low $NO_x$ burners are designed with advanced staged-combustion principles to reduce both fuel $NO_x$ and thermal $NO_x$. The staged-combustion process allows the overall combustion to be carried out in two separate combustion zones. In the air staging combustion process, the burner design allows 70 percent of stoichiometric air to burn in a fuel-rich, primary combustion zone. Some heat generated by this incomplete combustion is transferred to the boiler tubes. The combustion process is primary combustion zone. Because of the heat transfer within the primary combustion zone, the peak combustion temperature is lowered.

The fuel $NO_x$ formation is reduced as a result of the oxygen-starved condition in the fuel-rich primary combustion zone causing the total fixed nitrogen compounds (such as ammonia, hydrogen cyanide, and hydromonoxide) to form inert molecular nitrogen. The thermal $NO_x$

formation also is reduced because the lowered peak temperature in the secondary burnout zone does not provide a sufficient temperature for thermal oxidation of the triple-bond molecular nitrogen. Overall, the multi-staging combustion burners can achieve 30 to 65-percent $NO_x$ emission reduction over conventional burners.

Both LEA (single-staging) and multi-staging low $NO_x$ burners usually are designed with internal flue gas recirculation in order to enhance $NO_x$ emission reduction. In internal flue gas recirculation, combustion air within the burner is recirculated.

***Flue Gas Recirculation***

Flue gas recirculation (FGR) involves recycling a portion of the flue gas from the exhaust gas stream to the windbox of the boiler. Usually, the recycled flue gas is mixed with the inlet combustion air at the windbox before being introduced into the combustion chamber. In FGR, the recycled flue gas mainly serves as a dilutant to lower the overall peak combustion temperature. The heat sink effect occurs in FGR because the particulates in the recycled flue gas absorb some heat form the combustion process. These effects result in reductions of thermal $NO_x$ and have negligible change in fuel $NO_x$. Therefore, FGR is applied only to low nitrogen-content fuel, such as natural gas or distillate oil.

FGR typically can reduce thermal $NO_x$ by 55 to 65 percent based on 10 to 15-percent flue gas recirculation rates, respectively (Coen, 1991). The recirculation rates are limited to below 15 percent for oil-fired boilers because of burner flame instability and emissions of unburned combustibles. An application of FGR usually requires a low $NO_x$ burner that can be either a LEA burner or a multi-stage low $NO_x$ burner. Actual FGR efficiency depends on the boiler type and burner design.

**Technologies Involving Exhaust Gas Treatment**

In addition to boiler modification technologies, $NO_x$ emissions can be lowered by $NO_x$ reduction reactions by injecting reducing agents (i.e., ammonia or urea) into the flue gas stream. Also, an add-on device can be inserted into the flue gas ductwork to facilitate the $NO_x$ reduction process. A variety of reaction conditions is required depending on the type of reducing agent and catalyst used. For the package boiler, the following add-on $NO_x$ control devices have been identified: the $NO_x$OUT selective non-catalytic reduction (SNCR) process and selective catalytic reduction (SCR) with ammonia injection.

***$NO_x$OUT SNCR Process***

The $NO_x$OUT process originated from the initial research by the Electric Power Research Institute (EPRI) in 1976 on the use of urea to reduce $NO_x$. EPRI licensed the proprietary process to Fuel Tech, Inc., for commercialization. In the $NO_x$OUT process, aqueous urea is injected into the flue gas stream within the boiler, ideally within a temperature range of 1,600° F to 1,900° F. In the presence of oxygen, the following reaction occurs:

$$CO(NH_2)_2 + 2NO + \frac{1}{2} O_2 \rightarrow 2N_2 + CO_2 + 2H_2O$$

The amount of urea required is most cost-effective when the treatment rate is 0.5 to 2 moles of urea per mole of $NO_x$. In addition to the original EPRI urea patents, Fuel Tech offers a number of catalysts capable of expanding the effective temperature range of the reaction to between 1,000° F and 1,950° F. Advantages of the system are as follows:

1. Low capital and operating costs as a result of using urea injection, and
2. The proprietary catalysts used are nontoxic and nonhazardous, thus eliminating potential disposal problems.

Disadvantages of the system are as follows:

1. Formation of ammonia from excess urea treatment rates and/or improper use of reagent catalysts, and
2. $SO_3$, if present, will react with ammonia created from the urea to form ammonium bisulfate, potentially plugging the cold end equipment downstream.

There have been several commercial applications of the $NO_x$OUT process. These applications have been in California, Louisiana, Tennessee, Texas, and Florida (Osceola and Okeelanta cogeneration facilities). The reductions in $NO_x$ emissions have ranged from 25 percent to 75 percent.

***Selective Catalytic Reduction with Ammonia Injection***

Engelhard Corporation's discovery in 1957 that ammonia reacts selectively with $NO_x$ in the presence of a catalyst and excess oxygen has led to the commercialization of selective catalytic reduction (SCR) technology for industrial boilers of various sizes. The technology has been well developed and applied in Japan, especially for control of emissions from gas-, oil-, and coal-fired utility boilers.

It has been applied domestically on gas turbines, engine generators and natural gas-fired industrial boilers.

SCR catalysts consist of two types: metal oxides and zeolite. In the metal oxides catalytic system, either vanadium or titanium is embedded into a ceramic matrix structure; the zeolite catalysts are ceramic molecular sieves extruded into modules of honeycomb shape. The all-ceramic zeolite catalysts are durable and less susceptible to catalyst masking or poisoning than the noble metal/ceramic base catalysts. All catalysts exhibit advantages and disadvantages in terms of exhaust gas temperatures, ammonia/$NO_x$ ratio, and optimum exhaust gas oxygen concentrations. A common disadvantage for all catalyst systems is the narrow window of temperature between 600° F and 900°F within which the $NO_x$ reduction process takes place (Schorr, 1989; Steuler, 1990; Engelhard, 1990; Johnson-Matthey, 1990). Operating outside this temperature range results in catastrophic harm to the catalyst system. Chemical poisoning occurs at lower temperature conditions, while thermal degradation occurs at higher temperature. Reactivity can only be restored through catalyst replacement.

Catalysts are subject to loss of activity over time. Since the catalyst is the most costly component of the SCR system, applications require servicing and cleaning of catalyst surface every 2,000 to 3,000 hours of operation. The cleaning normally consists of blowing the catalyst surfaces with a compressed air gun or water jet. Most catalyst suppliers guarantee a catalyst of 3 years, assuming certain operating conditions. SCR is capable of potentially achieving 70 to 90 percent $NO_x$ reduction.

#### 5.3.3.2 Summary of Technically Feasible $NO_x$ Control Methods

All of the control methods described thus far are considered to be technically feasible. This section examines these control technologies. First, they are ranked according to their total removal effectiveness. Each alternative is then examined with regard to technical issues, environmental effects, energy requirements and impacts, and economic impacts.

This discussion also reviews previous BACT determinations for industrial fired boilers. Summaries of previous BACT determinations for fuel oil-fired and natural gas-fired industrial boilers are presented in Tables 5-10 and 5-11, respectively. This information was obtained from the RACT/BACT/LAER Clearinghouse on EPA's webpage. The types of control equipment from the

previous determinations consist of low $NO_x$ Burners, FGR and good combustion practices. The emission limits for the oil-fired boilers range from 0.1 lb/MMBtu to 0.3 lb/MMBtu. The emission limits for the natural gas-fired boilers range from 0.036 lb/MMBtu to 0.14 lb/MMBtu. PBPC's proposed $NO_x$ emission limits for the package boiler of 0.06 lb/MMBtu for natural gas firing and 0.12 lb/MMBtu for fuel oil (30-day rolling average) are at or near to the lowest BACT emission limits previously issued.

**Ranking of Feasible $NO_x$ Control Methods**

The top-down BACT approach requires the ranking of the $NO_x$ emission control alternatives in terms of achievable emission level. Only control options that result in a greater degree of emission reduction than the proposed control technology need to be considered. For the package boiler, the proposed control technology is a low-$NO_x$ burner with internal FGR and external FGR. The potentially more effective options, in order of removal effectiveness, are as follows: first the application of SCR with low-$NO_x$ burner and FGR; and second, SNCR with low-$NO_x$ burner and FGR. The BACT top-down hierarchy of the feasible control scenarios is presented in Table 5-12. A baseline condition must be established for BACT ranking and economic analysis purposes. The baseline for the package boiler is the proposed $NO_x$ emission limit of 0.12 lb/MMBtu for fuel-oil firing.

**Analysis of SCR**

**Technical Issues**

Technical Issues involved in the use of SCR are the narrowing operating temperature range, the potential damage to the catalyst and downstream equipment, and the ammonium bisulfate formation. A stack gas reheat system would be required to heat the exhaust gases up to the operating temperature of the SCR. This further complicates an already complex operation consisting of SCR components and an ammonia handling system. The use of ammonia as a reagent for the $NO_x$ reduction reactions may allow excess ammonia to form ammonia bisulfate compounds under irregular operating conditions. These compounds can serve as catalyst poisoning agents and also can damage to metal ductwork downstream. Thus, SCR application requires a strict maintenance cleaning every 2,000 to 2,500 hours of operation (Steuler, 1990). Cleaning consists of blowing the catalyst surfaces with a compressed air gun and vacuuming any soot.

Currently, there is no documented information concerning SCR application on industrial boilers of a similar size and source category as the package boiler. No other oil-fired or natural gas-fired boilers undergoing BACT review have been required to use SCR (refer to Table 5-10 and to Table 5-11).

***Environmental Effects***

The add-on SCR technology will pose other potential adverse environmental impacts, such as accidental spill and release of ammonia, slippage of ammonia by built-in design, and solid waste disposal for the spent catalyst. These issues are described briefly in the following discussion.

The SCR system requires the use of ammonia as reagent to convert to $NO_x$ to molecular nitrogen and water. The main environmental impact centers around the issue of delivery, handling, and storage of ammonia, which poses inherent safety and health risks in the event of accidental releases. In proposing $NO_x$ abatement regulations for stationary gas turbines, California's South Coast Air Quality Management District (SCAQMD) has performed a risk assessment study on spill handling and storage of ammonia. The study has concluded that this aspect of SCR operation realistically could present serious consequences and recommended further consideration of potential impacts and mitigation measures (SCAQMD, 1979). The current practice is to use an aqueous ammonia system (normally between 25 to 29-percent ammonia concentration) at installations locations used in populated areas. However, such practice increases the complexity, the size, and the cost of the ammonia system. Furthermore, ammonia slippage is a normal occurrence during operation of SCR control equipment. $NO_x$ abatement system suppliers generally report an ammonia slippage level of 10 ppm.

***Energy Requirements and Impacts***

The add-on technology of SCR imposes further energy penalties. The additional energy requirements are caused by a power loss as a result of additional back pressure from the SCR, electrical requirements for heating the ammonia solution and operating the injection system, and additional energy necessary for heating the ammonia solution and operating the injection system, and additional energy necessary for heating the exhaust gases from the package boiler from 410° F up to the SCR operating range of 700° F. A minimum of 16 MMBtu/hr would be required for stack gas reheating.

*Economic Analysis*

This section includes the total capital investment (TCI) and the annualized cost (AC) for SCR applied to the package boiler. All cost values are calculated from vendor quotes or standard costing procedures based on the Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual, Fifth Edition (OAQPS, 1996).

In this costing procedure, the basic equipment cost is the basis for other itemized costs that are calculated as fractional costs of the basic equipment cost. The capital cost estimates, the annualized cost estimates, and the cost effectiveness for SCR are presented in Table 5-13. The basic equipment cost for the SCR was obtained from a vendor for a previous BACT review for Okeelanta's Boiler No. 16.

For SCR applied to the proposed package boiler, with low-$NO_x$ burners, the TCI is $2.8 million; the annualized cost is $686,807 and the cost effectiveness is $8,086 per ton of $NO_x$ removed.

**Analysis of SNCR**

**Technical Issues**

The SNCR process operates best at temperatures of 1,000° F to 1,950° F. The maximum exhaust temperature of the package boiler will be approximately 410° F. Modifications to the process such as injector location can be used to inject the reagent at the ideal location in the furnace.

**Environmental Effects**

Since a liquid urea reagent is injected into the boiler, there is a chance of spilling the reagent during transport or storage of the reagent. Although the reagent is not listed as a hazardous substance, the vapors from the reagent can cause respiratory, skin and eye irritation when someone is exposed to them long enough.

**Energy Requirements**

SNCR requires additional energy. For the package boiler, the $NO_x$OUT SNCR process would consume between 15 and 20 kilowatts of electricity.

*Economic Analysis*

This section includes the TCI and the AC for the SNCR process applied to the package boiler. All cost values are calculated from vendor quotes and standard costing procedures based on the OAQPS Control Cost Manual, Fifth Edition (OAQPS, 1996).

In this costing procedure, the basic equipment cost is the basis for other itemized costs that are calculated as fractional costs of the basic equipment cost. The capital cost estimates, the annualized cost estimates, and the cost effectiveness for SNCR are presented in Table 5-14. The basic equipment cost for the SNCR was obtained from a vendor. For the SNCR process, the TCI is $950,000; the annualized cost is $282,011 and the cost effectiveness is $8,854 per ton of $NO_x$ removed.

### 5.3.3.3 $NO_x$ BACT Summary and Conclusion

The BACT analysis for $NO_x$ control has identified two feasible control alternatives that achieve greater reduction than low-$NO_x$ burners with FGR alone: ceramic-based SCR and SNCR. This section will consider the overall environmental, energy, and economic impacts of each alternative and eliminate those with adverse impacts. The control alternative not eliminated will be selected as BACT.

**Comparison of Technical Issues**

Compared to the two alternatives, the low $NO_x$ burner design with FGR is the most reliable option overall for industrial boiler application. Add-on control technology such as SCR application and SNCR application on the modified boiler will further complicate the entire boiler operation. These potential complications are a result of significant routine maintenance and unscheduled downtime because of malfunction or failure of components.

**Comparison of Environmental Effects**

The add-on control technology options pose the greatest potential for environmental impacts. SCR poses the greatest potential for toxic impacts as a result of ammonia handling and storage, and ammonia slip. Although the reagents used in the $NO_x$Out SNCR process is not a listed toxic, there is still a risk for spills and leaks. The boiler modifications do not have any adverse environmental effects. Therefore, the boiler modification process involving both LNB and FGR is the best $NO_x$ control technology for the package boiler in regard to the environmental effects.

**Comparisons of Energy Impacts**

The options involving add-on control technology require additional fuel and energy. The low-$NO_x$ burner option does not require additional fuel or electricity to operate. Therefore, the boiler modification process using the LNB/FGR option is the best $NO_x$ control technology with regard to energy impacts.

**Comparison of Economic Analysis**

The add-on control technology options involve significant TCI and high cost effectiveness for removal of $NO_x$. The cost effectiveness of the SCR option is $8,086 and the cost effectiveness of the SNCR option is $8,854. The high cost effectiveness of these options deem the add-on control technology options economically infeasible. Therefore, the LNB/FGR option is the best $NO_x$ control technology with regard to economic impacts.

**Conclusion**

The $NO_x$ top-down BACT analysis in terms of environmental impacts, energy impacts, and economical impacts for the package boiler is summarized in Table 5-15. The analysis has included two add-on control technologies. The main reasons for eliminating both SCR and SNCR are their high cost effectiveness. This is consistent with previous BACT determinations for $NO_x$ emissions from industrial boilers. There are no existing industrial boilers that have been required to use SCR or SNCR for $NO_x$ control (refer to Tables 5-10 and 5-11). By eliminating both add-on control technology options, the LNB with FGR option is concluded to be BACT for $NO_x$ emissions from the package boiler.

### 5.3.4 SULFURIC ACID MIST

The proposed BACT for SAM emissions is the use of low sulfur fuels. Emissions of SAM are related to $SO_2$ emissions. $SO_2$ and SAM emissions will be controlled by burning natural gas and low sulfur content fuel oil. Low sulfur fuel oil and natural gas are inherently low in sulfur; therefore, produce low SAM emissions.

Since emissions of SAM are related to $SO_2$ emissions, BACT for $SO_2$ also represents BACT for SAM. The maximum emissions for SAM are 3.6E-5 lb/MMBtu when burning natural gas and 0.0026 lb/MMBtu when burning fuel oil. This is equivalent to 2.27 TPY of SAM emissions.

### 5.3.5 LEAD

Pb emissions from the package boiler are expected to be extremely low. The maximum predicted Pb emissions from the package boiler are estimated to be 8.0E-3 TPY. It would not be economical to install any add-on control equipment to decrease Pb emissions any further than what is achievable through burning clean fuels (i.e., natural gas and No. 2 fuel oil with a maximum sulfur content of 0.05 percent). Therefore, clean fuels are proposed as BACT for Pb emissions.

### 5.3.6 RACT ANALYSIS FOR VOC

Florida's air rules require the application of RACT for any proposed major source of VOC to be located in Palm Beach County. The estimated maximum emissions for VOC from the package boiler are 0.03 lb/MMBtu.

For a boiler, the only feasible RACT control technology for VOC is good combustion practices. The package boiler will represent a modern boiler with modern combustion controls. RACT is good combustion practices with VOC emissions of 0.03 lb/MMBtu.

Table 5-1. Summary of BACT Determinations for Sulfur Dioxide from Biomass-Fired Boilers

| Company Name | State | RBLC ID | Permit Issue Date | Throughput Per Unit | Emission Limits: As provided in BACT/LAER Clearinghouse | Emission Limits: Converted to lb/MMBtu | Control Technology/Comment | Efficiency % |
|---|---|---|---|---|---|---|---|---|
| Grayling Generating Station L.P. | MI | 882-89E | 9/18/01 | 523 MMBtu/hr | 11.2 lb/hr (24-hour avg.) | 0.02 | Multicyclones, ESP, SNCR | -- |
| U.S. Sugar Corporation, Clewiston Mill (Blr 4) | FL | PSD-FL-272A [b] | 3/8/01 | 633 MMBtu/hr | 0.06 lb/MMBtu | 0.06 | Bagasse Boiler | -- |
| Champion International | AL | AL-0112 | 12/9/97 | 710 MMBtu/hr | 0.03 lb/MMBtu | 0.03 | | 95 |
| Mead Containerboard | AL | AL-0099 | 1/15/97 | 620 MMBtu/hr | 0.02 lb/MMBtu | 0.02 | Combustion Control | -- |
| Willamette Industries - Marlboro Mill | SC | SC-0045 | 4/17/96 | 470 MMBtu/hr | 0.1 lb/MMBtu | 0.10 | No controls feasible | -- |
| U.S. Sugar Corporation, Clewiston Mill (Blr 7) | FL | FL-0094 | 1/31/95 | 738 MMBtu/hr | 0.17 lb/MMBtu | 0.17 | Bagasse Boiler | -- |
| KES Chateaugay Project | NY | NY-0055 | 12/19/94 | 275 MMBtu/hr | 0.03 lb/MMBtu | 0.03 | Fuel spec: backup oil < 0.08% sulfur | -- |
| Okeelanta Power Limited Partnership | FL | FL-0069 | 9/27/93 | 715 MMBtu/hr | 0.02 lb/MMBtu 30 day avg. | 0.02 | Low sulfur fuel (Bagasse Firing) | -- |
| Osceola Power Limited Partnership | FL | FL-0070 | 9/27/93 | 665 MMBtu/hr | 0.02 lb/MMBtu 30 day avg. | 0.02 | Low sulfur fuel (Bagasse Firing) | -- |
| Scott Paper Company | WA | WA-0276 | 7/1/93 | 718 MMBtu/hr | 70 lb/hr 12 mo. avg. | 0.10 | Fuel spec: backup fuel limited to 0.05% sulfur distillate | -- |
| Multitrade Limited Partnership | VA | VA-0183 | 2/21/92 | 373.7 MMBtu/hr | 0.016 lb/MMBtu | 0.016 | No controls feasible | -- |
| | | | | | AVERAGE: | 0.06 | | |
| | | | | | MAXIMUM: | 0.17 | | |
| | | | | | MINIMUM: | 0.016 | | |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2002

[a] Assumed 8,760 hr/yr.

[b] This information was obtained from the actual PSD permit, not the clearinghouse.

Table 5-2. Summary of BACT Determinations for Nitrogen Oxide Emissions from Biomass-Fired Boilers

| Company Name | State | RBLC ID | Permit Issue Date | Throughput Per Unit | Emission Limits: As provided in BACT/LAER Clearinghouse | Emission Limits: Converted to lb/MMBtu | Control Technology/Comment | Efficiency % |
|---|---|---|---|---|---|---|---|---|
| Grayling Generating Station L.P. | MI | 882-89E | 9/18/01 | 523 MMBtu/hr | 78.5 lb/hr (30-day rolling) | 0.15 | Multicyclones, ESP, SNCR | -- |
| Atlantic Sugar Association | FL | PSD-FL-078A [a] | 6/7/01 | 255.3 MMBtu/hr | 0.16 lb/MMBtu | 0.16 | Good Combustion Practices (Bagasse Boiler) | -- |
| U.S. Sugar Corporation, Clewiston Mill (Blr 4) | FL | PSD-FL-272A [a] | 3/8/01 | 633 MMBtu/hr | 0.2 lb/MMBtu | 0.20 | Good Combustion Practices (Bagasse Boiler) | -- |
| Gulf States Paper Corp | AL | AL-0122 | 10/14/98 | 98 MMBtu/hr | 0.3 lb/MMBtu | 0.30 | -- | -- |
| Wellborn Cabinet Inc. | AL | AL-0107 | 2/3/98 | 29.5 MMBtu/hr | 13.57 lb/hr | 0.46 | Boiler design and combustion control | 31 |
| Gulf States Paper Corporation | AL | AL-0116 | 12/10/97 | 775 MMBtu/hr | 0.3 lb/MMBtu | 0.30 | Low NOx natural gas and fuel oil burners | 50 |
| Champion International | AL | AL-0112 | 12/9/97 | 710 MMBtu/hr | 0.25 lb/MMBtu | 0.25 | Addition of tertiary air system | 30 |
| Plum Creek MFG - Evergreen Facilty | MT | MT-0007 | 2/15/97 | 225 MMBtu/hr | 104 lb/hr | 0.46 | -- | -- |
| Mead Containerboard | AL | AL-0099 | 1/15/97 | 620 MMBtu/hr | 0.25 lb/MMBtu | 0.25 | Combustion Control | -- |
| Vaughan Furniture Company | VA | VA-0237 | 8/28/96 | 28 MMBtu/hr | 24 TPY[a] | 0.20 | No controls feasible | -- |
| Willamette Industries - Marlboro Mill | SC | SC-0045 | 4/17/96 | 470 MMBtu/hr | 0.3 lb/MMBtu | 0.30 | Good combustion control | -- |
| Weyerhaeuser Company | MS | MS-0026 | 5/9/95 | 90 MMBtu/hr | 0.23 lb/MMBtu | 0.23 | Combustion controls | -- |
| Georgia Pacific Corp. - Glostee Facility | MS | MS-0023 | 4/11/95 | 244 MMBtu/hr | 0.3 lb/MMBtu | 0.30 | No controls feasible | -- |
| U.S. Sugar Corporation, Clewiston Mill (Blr 7) | FL | FL-0094 | 1/31/95 | 738 MMBtu/hr | 0.25 lb/MMBtu | 0.25 | Low NOx Burners (Bagasse Boiler) | -- |
| KES Chateaugay Project | NY | NY-0055 | 12/19/94 | 275 MMBtu/hr | 0.23 lb/MMBtu | 0.23 | No controls feasible | -- |
| Weyerhaeuser Co. | AL | AL-0079 | 10/28/94 | 91 MMBtu/hr | 0.23 lb/MMBtu | 0.23 | -- | -- |
| Scott Paper Company | WA | WA-0276 | 7/1/93 | 718 MMBtu/hr | 150 ppm @ 7% $O_2$ 30/day | -- | Combustion controls | -- |
| Cogeneration Michigan Associates | MI | MI-0180 | 11/1/92 | 523 MMBtu/hr | 0.15 lb/MMBtu | 0.15 | SNCR | -- |
| Newman Paper Co. | PA | PA-0093 | 4/24/92 | 129 MMBtu/hr | 0.3 lb/MMBtu | 0.30 | Low $NO_x$ burners | -- |
| Multitrade Limited Partnership | VA | VA-0183 | 2/21/92 | 373.7 MMBtu/hr | 0.1 lb/MMBtu | 0.10 | SNCR, Urea injection system | 50 |
| | | | | | AVERAGE: | 0.26 | | |
| | | | | | MAXIMUM: | 0.46 | | |
| | | | | | MINIMUM: | 0.10 | | |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2002

[a] This information was obtained from the actual PSD permit, not the clearinghouse.

Table 5-3. Summary of BACT Determinations for Fluorides Emissions from Biomass-Fired Boilers

| Company Name | State | RBLC ID | Permit Issue Date | Throughput Per Unit | Emission Limits: As provided in BACT/LAER Clearinghouse | Emission Limits: Converted to lb/MMBtu | Control Technology/Comment |
|---|---|---|---|---|---|---|---|
| Multitrade Limited Partnership | VA | VA-0183 | 2/21/92 | 373.7 MMBtu/hr | 0.64 lb/hr | 1.7E-03 | No controls feasible |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2001

[a] Assumed 8,760 hr/yr.

Table 5-4. Summary of BACT Determinations for Sulfuric Acid Mist Emissions from Biomass-Fired Boilers

| Company Name | State | RBLC ID | Permit Issue Date | Throughput Per Unit | Emission Limits As provided in BACT/LAER Clearinghouse | Control Technology/Comment |
|---|---|---|---|---|---|---|
| Grayling Generating Station L.P. | MI | 882-89E | 9/18/01 | 523 MMBtu/hr | 0.003 lb/MMBtu | Multicyclones, ESP, SNCR |
| Mead Containerboard | AL | AL-0099 | 1/15/97 | 620 MMBtu/hr | 0.001 lb/MMBtu | Combustion Control |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2001

Table 5-5. Summary of BACT Determinations for Lead Emissions from Biomass-Fired Boilers

| Company Name | State | RBLC ID | Permit Issue Date | Throughput Per Unit | Emission Limits: As provided in BACT/LAER Clearinghouse | Emission Limits: Converted to lb/MMBtu | Control Technology/Comment |
|---|---|---|---|---|---|---|---|
| Grayling Generating Station L.P. | MI | 882-89E | 9/18/01 | 523 MMBtu/hr | 0.02 lb/hr (3-hour avg.) | 3.82E-05 | Multicyclones, ESP, SNCR |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2001

Table 5-6. BACT Determinations for $SO_2$ Emissions for Fuel Oil-Fired Industrial Boilers, 100 MMBtu/hr or Greater

| Company | State | RBLC ID | Permit Date | Throughput | Emission Limits As Provided In LAER/BACT Clearinghouse | Control Equipment/Description |
|---|---|---|---|---|---|---|
| McCaine Food Inc. | ME | ME-0017 | 3/12/99 | 81,000 lbs steam/hr | 0.52 lb/MMBtu | 0.5% Sulfur Fuel Oil |
| Proctor and Gamble Manufacturing Company | TN | TN-0054 | 3/19/98 | -- | 37.96 lb/hr | -- |
| Appleton Paper, Inc. | WI | WI-0065 | 1/12/93 | 200,000 lbs steam/hr | 0.507 lb/MMBtu | -- |
| Okeelanta Corporation | FL | FL-0048 | 7/29/91 | 205 MMBtu/hr | 0.51 lb/MMBtu | Fuel Spec: Limit Fuel Sulfur Content |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2000

Table 5-7. BACT Determinations for $SO_2$ Emissions for Natural Gas-Fired Industrial Boilers, 100 MMBtu/hr or Greater

| Company | State | RBLC ID | Permit Date | Heat Input | Emissions: As Provided In LAER/BACT Clearinghouse | Emissions: Converted to lb/MMBtu [a] | Control Equipment/Description |
|---|---|---|---|---|---|---|---|
| PSEG Lawrenceburg Energy Facility | IN | IN-0085 | 6/7/01 | 124.6 MMBtu/hr | 0.006 lb/MMBtu | 0.006 | Low Sulfur Gas (<0.8% by wt.) |
| Texasgulf Soda Ash Plant | WY | WY-0035 | 10/13/97 | 431.6 MMBtu/hr | Negligible | -- | Natural Gas Fuel |
| Weyerhaeuser Company | MS | MS-0029 | 9/10/96 | 400 MMBtu/hr | 5.7 E-4 lb/MMBtu | 0.00057 | Use of Natural Gas as Fuel |
| Transamerican Refining Corporation | LA | LA-0090 | 2/10/95 | 244 MMBtu/hr | 6.6 lb/hr | 0.03 | Fuel Specification |
| Newark Bay Cogeneration Partnership, L.P. | NJ | NJ-0017 | 6/9/93 | 200 MMBtu/hr | 0.0026 lb/MMBtu | 0.0026 | Fuel Spec: Natural Gas |
| Willamette Industries Inc. | LA | LA-0074 | 2/4/91 | 335 MMBtu/hr | 0.2 lb/hr | 0.0006 | Fuel Spec: Low Sulfur Fuel |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2000

Footnotes:

[a] To convert from lb/hr, the emission limit was divided by the heat input rate.

Table 5-8. BACT Determinations for $PM/PM_{10}$ Emissions for Fuel Oil-Fired Industrial Boilers, 100 MMBtu or Greater

| Company | State | RBLC ID | Permit Date | Throughput | Emissions | | Control Equipment/Description |
|---|---|---|---|---|---|---|---|
| | | | | | As Provided In LAER/BACT Clearinghouse | Converted to lb/MMBtu [a] | |
| Toyota Motor Manufacturing U.S.A. Inc. | KY | KY-0052 | 7/17/86 | 0 | 0.05 lb/MMBtu | 0.05 | -- |
| McCaine Food Inc. | ME | ME-0017 | 3/12/99 | 656.7 gal/hr | 0.08 lb/MMBtu | 0.08 | 0.5 % Sulfur Fuel Oil |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2000

Footnotes:

[a] To convert from lb/hr, the emission limit was divided by the throughput rate.

Table 5-9. BACT Determinations for $PM/PM_{10}$ Emissions for Natural Gas-Fired Industrial Boilers, 100 MMBtu/hr or Greater

| Company | State | RBLC ID | Permit Date | Throughput | Emissions: As Provided In LAER/BACT Clearinghouse | Emissions: Converted to lb/MMBtu [a] | Control Equipment/Description |
|---|---|---|---|---|---|---|---|
| PSEG Lawrenceburg Energy Facility | IN | IN-0085 | 6/7/01 | 124.6 MMBtu/hr | 0.007 lb/MMBtu | 0.007 | Good Combustion |
| Alabama Power Company | AL | AL-0128 | 3/16/99 | 220 MMBtu/hr | 0.008 lb/MMBtu | 0.008 | Nat. Gas Only |
| Cargill Inc. - Sioux City | IA | IA-0048 | 6/1/98 | 4500 TPD | 0.7 lb/hr | -- | 500 hr/yr Restriction |
| Chevron Chemical Company | LA | LA-0114 | 12/10/97 | 600 MMBtu/hr | 0.025 lb/MMBtu | 0.025 | Good Design and Operation |
| Texasgulf Soda Ash Plant | WY | WY-0035 | 10/13/97 | 431.6 MMBtu/hr | 0 NEGLIGIBLE | -- | Natural Gas Fuel |
| Grain Processing Corp. | IN | IN-0075 | 6/10/97 | 244 MMBtu/hr | 5 lb/MMCF | 0.005 | -- |
| Westlake Petrochemicals Corporation | LA | LA-0100 | 1/18/96 | 215 MMBtu/hr | 1.8 TPY | 0.002 | Good Design, Proper Operating Practices, Clean Fuels |
| Transamerican Refining Corporation | LA | LA-0090 | 2/10/95 | 244 MMBtu/hr | 1.2 lb/hr | 0.005 | Fuel Specification |
| Newark Bay Cogeneration Partnership, L.P. | NJ | NJ-0017 | 6/9/93 | 200 MMBtu/hr | 0.005 lb/MMBtu | 0.005 | Boiler Design/FGR |
| | | | | | AVERAGE | 0.01 | |
| | | | | | MAXIMUM | 0.03 | |
| | | | | | MINIMUM | 0.002 | |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2000

Footnotes:

[a] To convert from lb/hr, the emission limit was divided by the throughput rate. To convert from lb/MMCF, the emission limit was divided by 1,020 MMCF/MMBtu.

Table 5-10. BACT Determinations for $NO_x$ Emissions for Fuel Oil-Fired Industrial Boilers, 100 MMBtu or Greater

| Company | State | RBLC ID | Permit Date | Throughput | Emissions: As Provided In LAER/BACT Clearinghouse | Emissions: Converted to lb/MMBtu [a] | Control Equipment/Description | % Efficiency |
|---|---|---|---|---|---|---|---|---|
| McCaine Food Inc. | ME | ME-0017 | 3/12/99 | 656.7 gal/hr | 0.3 lb/MMBtu | 0.3 | Low NOx Burners, Staged Air, Flue Gas Recirculation | -- |
| Piney Point Phosphates, Inc. | FL | FL-0090 | 9/23/94 | 190 MMBtu/hr | 28.5 lb/hr | 0.15 | Low NOx Burners, EGR | -- |
| Appleton Paper, Inc. | WI | WI-0065 | 1/12/93 | 200000 lbs steam/hr | 0.1 lb/MMBtu | 0.1 | Low NOx Burners and Flue Gas Reinductor | 75 |
| Okeelanta Corporation | FL | FL-0048 | 7/29/91 | 205 MMBtu/hr | 0.18 lb/MMBtu | 0.18 | Combustion Control | -- |
| | | | | | AVERAGE | 0.18 | | |
| | | | | | MAXIMUM | 0.3 | | |
| | | | | | MINIMUM | 0.1 | | |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2000

Footnotes:

[a] To convert from lb/hr, the emission limit was divided by the throughput rate.

Table 5-11. BACT Determinations for $NO_x$ Emissions for Natural Gas-Fired Industrial Boilers, 100 MMBtu/hr or Greater

| Company | State | RBLC ID | Permit Date | Throughput | Emission Limits: As Provided In LAER/BACT Clearinghouse | Emission Limits: Converted to lb/MMBtu [a] | Control Equipment/Description | % Efficiency |
|---|---|---|---|---|---|---|---|---|
| PSEG Lawrenceburg Energy Facility | IN | IN-0085 | 6/7/01 | 124.6 MMBtu/hr | 0.036 lb/MMBtu | 0.036 | Low NOx Burners | -- |
| Detroit Edison Company | MI | MI-0259 | 2/18/00 | 840 MMBtu/hr | 0.15 lb/MMBtu | 0.15 | Low NOx Burners; Flue Gas Recirc. | -- |
| Alabama Power Company | AL | AL-0128 | 3/16/99 | 220 MMBtu/hr | 0.053 lb/MMBtu | 0.053 | LNB and flue gas recirculation | -- |
| Archer Daniels Midland Company | IL | IL-0060 | 12/24/98 | 350 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low-NOx Burners; Fuel Selection | -- |
| Alliant Energy | IA | IA-0045 | 5/29/98 | 278 MMBtu/hr | 0.1 lb/MMBtu | 0.1 | Low NOx Burner with Steam Injection | -- |
| Chevron Chemical Company | LA | LA-0114 | 12/10/97 | 600 MMBtu/hr | 0.141 lb/MMBtu | 0.141 | Ultra Low NOx Burners and FGR | -- |
| Bucknell University | PA | PA-0149 | 11/26/97 | 24000 lb/hr steam | 0.1 lb/MMBtu | 0.1 | – | -- |
| Shell Chemical Company | LA | LA-0115 | 11/3/97 | 300 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low NOx Burner and internal FGR | -- |
| Texasgulf Soda Ash Plant | WY | WY-0035 | 10/13/97 | 431.6 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low NOx Burners with 16% FGR | -- |
| Grain Processing Corp. | IN | IN-0075 | 6/10/97 | 244 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low NOx Burners and FGR | -- |
| Quincy Soybean Company of Arkansas | AR | AR-0019 | 3/4/97 | 123 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low NOx Combustors | -- |
| IMC-Agrico Company - Faustina Plant | LA | LA-0105 | 10/16/96 | 320 MMBtu/hr | 0.08 lb/MMBtu | 0.08 | Low NOx Burners | -- |
| Weyerhaeuser Company | MS | MS-0029 | 9/10/96 | 400 MMBtu/hr | 0.1 lb/MMBtu | 0.1 | Low NOx Burners and FGR | -- |
| Star Enterprise - Louisiana Plant Refinery | LA | LA-0102 | 7/29/96 | 570 MMBtu/hr | 0.08 lb/MMBtu | 0.08 | Low NOx Burners (Staged Combustion, Staged Fuel) | -- |
| Transamerican Refining Corporation | LA | LA-0090 | 2/10/95 | 244 MMBtu/hr | 19.8 lb/hr | 0.08 | Low NOx Burners/Combustion Control | -- |
| Archer Daniels Midland Company | IL | IL-0058 | 8/11/94 | 350 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low NOx Burners; Fuel Selection | -- |
| Champion International Corp. | FL | FL-0087 | 3/25/94 | 533 MMBtu/hr | 0.06 lb/MMBtu | 0.06 | COEN Low NOx Burners and FGR | -- |
| FMC WY Corporation - Green River Soda Ash Plant | WY | WY-0028 | 9/7/93 | 234 MMBtu/hr | 0.1 lb/MMBtu | 0.1 | Low NOx Burners with Low Excess Air and FGR | -- |
| SF Phosphate Limited Company | WY | WY-0043 | 7/2/93 | 350 MMBtu/hr | 0.14 lb/MMBtu | 0.14 | Low NOx Burners | -- |
| SF Phosphate Limited Company | WY | WY-0043 | 7/2/93 | 350 MMBtu/hr | 0.14 lb/MMBtu | 0.14 | Low NOx Burners | -- |
| Newark Bay Cogeneration Partnership, L.P. | NJ | NJ-0017 | 6/9/93 | 200 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low NOx Burners, FGR | -- |
| American Crystal Sugar Company | MN | MN-0019 | 12/15/92 | 200.1 MMBtu/hr | 0.075 lb/MMBtu | 0.075 | Low NOx Burner with FGR Boiler Installation | -- |
| CPC - Corn Products Division | IL | IL-0044 | 8/6/92 | 600 MMBtu/hr | 0.05 lb/MMBtu | 0.05 | Low NOx Burner and FGR | 85 |
| | | | | | AVERAGE | 0.08 | | |
| | | | | | MAXIMUM | 0.15 | | |
| | | | | | MINIMUM | 0.036 | | |

Reference: RACT/BACT/LAER Clearinghouse on EPA's Webpage, 2000
FGR = Flue Gas Recirculation

Footnotes:

[a] To convert from lb/hr, the emission limit was divided by the throughput rate. To convert from TPY, the emission limit was converted into lb/hr by assuming 8,760 hours of operation and then divided by the throughput rate.

Table 5-12. BACT "Top-down" Hierarchy of $NO_x$ Reduction Methods for the Proposed Package Boiler, PBPC

| Top-Down Ranking | Technology | Control Effectiveness (%) | Emission Level (lb/MMBtu) | Annual Emissions (TPY) |
|---|---|---|---|---|
| First | Low-$NO_x$ burner with SCR | 92[a] | 0.030 | 21.2 |
| Second | Low-$NO_x$ burner with SNCR | 72[b] | 0.105 | 74.3 |
| Third | Low-$NO_x$ burner with FGR | 60 | 0.12[c] | 106.2 [d] |

Footnotes:

[a] SCR alone can achieve 80 percent reduction.

[b] SNCR alone can achieve 30 percent reduction.

[c] Proposed package boiler emission rate for fuel-oil firing.

[d] Based on an emission rate of 0.12 lb/MMBtu for fuel oil-firing at 202 MMBtu/hr for 8,760 hours.

Table 5-13. Cost Effectiveness of SCR, PBPC Package Boiler

| Cost Items | Cost Factors[a] | Cost ($) |
|---|---|---|
| DIRECT CAPITAL COSTS (DCC): | | |
| Purchased Equipment Cost (PEC) | | |
| SCR Basic Process | Vendor quote[b] | 1,400,000 |
| Ammonia System | See note "c" | 36,560 |
| Auxilary Equipment (Reheat) | 10% of equipment cost | 140,000 |
| Emissions Monitoring | 15% of equipment cost | 140,000 |
| Structure Support | 8% of equipment cost | 112,000 |
| Freight | 5% of equipment cost | 70,000 |
| Taxes | Florida sales tax, 6% | 84,000 |
| Total PEC: | | 1,982,560 |
| Direct Installation | 30% of PEC | 594,768 |
| Total DCC: | | 2,577,328 |
| INDIRECT CAPITAL COSTS (ICC): | | |
| Engineering | 10% of PEC | 257,733 |
| Construction and field expenses | 5% of PEC | 128,866 |
| Contractor Fees | 10% of PEC | 257,733 |
| Startup | 2% of PEC | 51,547 |
| Performance test | 1% of PEC | 25,773 |
| Contingencies | 3% of PEC | 77,320 |
| Total DCC: | | 798,972 |
| TOTAL CAPITAL INVESTMENT (TCI): | DCC + ICC | 2,781,532 |
| DIRECT OPERATING COSTS (DOC): | | |
| (1) Operating Labor | | |
| Operator | 0.5 hr/shift, $16/hr, 8760 hrs/yr | 8,760 |
| Supervisor | 15% of operator cost | 1,314 |
| (2) Maintenance | Vendor quote | 10,000 |
| (3) Variable O&M[d,e] | 202 MMBtu/hr; 8,760 hr/yr | 44,300 |
| (4) Catalyst Replacement and disposal[e] | 202 MMBtu/hr; 8,760 hr/yr; 3 year life | 104,150 |
| Total DOC: | | 168,524 |
| INDIRECT OPERATING COSTS (IOC): | | |
| Overhead | 60% of oper. labor & maintenance | 12,044 |
| Property Taxes | 1% of total capital investment | 27,815 |
| Insurance | 1% of total capital investment | 27,815 |
| Administration | 2% of total capital investment | 55,631 |
| Total IOC: | | 123,306 |
| CAPITAL RECOVERY COSTS (CRC): | CRF of 0.142 times TCI (10 yrs @ 7%) | 394,977 |
| ANNUALIZED COSTS (AC): | DOC + IOC + CRC | 686,807 |
| BASELINE $NO_x$ EMISSIONS (TPY): | 0.12 lb/MMBtu; 202 MMBtu/hr; 8,760 hr/yr (fuel oil) | 106.2 |
| MAXIMUM $NO_x$ EMISSIONS (TPY): | 80% reduction | 21.2 |
| REDUCTION IN $NO_x$ EMISSONS (TPY): | | 84.9 |
| COST EFFECTIVENESS: | $ per ton of $NO_x$ Removed | 8,086 |

Footnotes:

[a] Unless otherwise specified, factors and cost estimates reflect OAQPS Cost Manual, Section 3, Fifth edition. Cost estimates have been converted from 1988 dollars to 1999 dollars by a ratio of CE Cost Indexes (1988: 342.5, 1999: 400).

[b] Vendor quote from 1991 quote for SCR system for Okeelanta's Boiler No. 16. Quote has been converted from 1991 dollars to 1999 dollars by a ratio of CE Cost Indexes (1991: 361.3, 1999: 400)

[c] Ammonia vendor's quotation for LaRoche Industries, Inc. for a 3,000-gallon anhydrous ammonia tank, an ammonia evaporator, and a dual-valve pressure regulator. Quote was converted to 1999 dollars from 1991 dollars by a ratio of CE Cost Indexes (1991: 361.3 and 1999: 400).

[d] Includes cost of ammonia, electricity and steam.

[e] Based on cost equation and factors from the EPA document titled "New Source Performance Standards, Subpart Db - Technical Support for Proposed Revisions to NOx Standard" (6/97). See Appendix A for equation and factors.

Table 5-14. Cost Effectiveness of SNCR, PBPC Package Boiler

| Cost Items | Cost Factors[a] | Cost ($) |
|---|---|---|
| DIRECT CAPITAL COSTS (DCC): | | |
| Purchased Equipment Cost (PEC) | | |
| SNCR Process Equipment | Vendor quote | 750,000 |
| Freight | Vendor quote | 20,000 |
| Taxes | Florida sales tax, 6% | 45,000 |
| Total PEC: | | 815,000 |
| Direct Installation Cost | | |
| Foundation and Supports | 8% of SNCR Process Equipment Cost | 60,000 |
| Electrical | 4% of SNCR Process Equipment Cost | 30,000 |
| Piping | 2% of SNCR Process Equipment Cost | 15,000 |
| Total Direct Installation Cost: | | 105,000 |
| Total DCC | | 920,000 |
| INDIRECT CAPITAL COSTS (ICC): | | |
| Engineering | | Included Above |
| Startup | | Included Above |
| Performance Tests | 1% of SNCR Process Equipment Cost | 7,500 |
| Contingency | 3% of SNCR Process Equipment Cost | 22,500 |
| Total ICC | | 30,000 |
| TOTAL CAPITAL INVESTMENT (TCI): | DCC + ICC | 950,000 |
| DIRECT OPERATING COSTS (DOC): | | |
| (1) Operating Labor | | |
| Operator | 0.5 hr/shift, $15/hr, 8760 hrs/yr | 8,213 |
| Supervisor | 15% of operator cost | 1,232 |
| (2) Maintenance | Vendor quote | 15,000 |
| (3) Electricity | Vendor quote | 25,000 |
| (4) Reagent (Urea) | Vendor quote | 45,000 |
| Total DOC: | | 94,444 |
| INDIRECT OPERATING COSTS (IOC): | | |
| Overhead | 60% of oper. labor & maintenance | 14,667 |
| Property Taxes | 1% of total capital investment | 9,500 |
| Insurance | 1% of total capital investment | 9,500 |
| Administration | 2% of total capital investment | 19,000 |
| Total IOC: | | 52,667 |
| CAPITAL RECOVERY COSTS (CRC): | CRF of 0.142 times TCI (10 yrs @ 7%) | 134,900 |
| ANNUALIZED COSTS (AC): | DOC + IOC + CRC | 282,011 |
| BASELINE $NO_x$ EMISSIONS (TPY) : | 0.12 lb/MMBtu; 202 MMBtu/hr; 8,760 hr/yr (fuel oil) | 106.2 |
| MAXIMUM $NO_x$ EMISSIONS (TPY) : | 30% reduction | 74.3 |
| REDUCTION IN $NO_x$ EMISSONS (TPY): | | 31.9 |
| COST EFFECTIVENESS: | $ per ton of $NO_x$ Removed | 8,854 |

Footnotes:

[a] Unless otherwise specified, factors and cost estimates reflect OAQPS Cost Manual, Section 3, Fifth edition.

Table 5-15. Summary of Top-Down BACT Impact Analysis Results for $NO_x$

| Control Alternative | Total Emission Reduction (TPY) | Potential Environmental Impacts | | Energy Impacts | | Economic Impacts | |
|---|---|---|---|---|---|---|---|
| | | Toxic Air Impact? | Adverse Environmental Impacts? | Incremental Increase Over Baseline? Fuel | Electricity | Annualized Cost ($) | Cost Effectiveness ($/ton) |
| Low-$NO_x$ burner with SCR | 85.0 | Yes | Yes | Yes | Yes | 686,807 | 8,086 |
| Low-$NO_x$ burner with SNCR | 31.9 | No | Yes | Yes | Yes | 282,011 | 8,854 |
| Low-$NO_x$ burner with FGR | -- | No | No | No | No | -- | -- |

# 6.0 AIR QUALITY IMPACT ANALYSIS METHODOLOGY

## 6.1 GENERAL APPROACH

The modeling analysis for the proposed PBPC project addresses two operational scenarios:

1. Operation of the PBPC facility after the permanent shutdown of the Osceola Farms sugar mill boilers; and
2. Simultaneous operation of the PBPC facility and the Osceola Farms sugar mill boilers, which could occur for up to 120 days (2,880 hours) over a one year time period after initial startup of the facility.

The general modeling approach followed EPA and FDEP modeling guidelines for determining compliance with AAQS and PSD increments. For all criteria pollutants that will be emitted in excess of the PSD significant emission rate due to a proposed project, a significant impact analysis is performed. This analysis determines whether the emission and/or stack configuration changes due to the project alone will result in predicted impacts that are in excess of the EPA significant impact levels at any location beyond the plant's restricted boundaries.

Generally, if the facility undergoing the modification is within 200 kilometers 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 Everglades National Park (ENP) is a PSD Class I area that is located within 200 km of the proposed PBPC project, the maximum predicted impacts at the ENP are compared to EPA's proposed significant impact levels for PSD Class I areas. These recommended levels have not been promulgated as rules but are the currently accepted criteria to determine whether a proposed project will result in a significant impact on a PSD Class I area.

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 demonstrates compliance with federal and Florida ambient air quality standards (AAQS), and the second analysis demonstrates compliance with allowable PSD Class II increments.

If the project-only impacts at the PSD Class I area are 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. The proposed project's maximum emission increases

are evaluated at the PSD Class I area to support the air quality related values (AQRV) analysis, and includes an evaluation of regional haze degradation and deposition impacts.

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. [Note that for determining compliance with the 24-hour AAQS for particulate matter only, the sixth highest predicted concentration in five years (i.e., H6H) is used to compare to the applicable 24-hour AAQS.]

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.

To develop the maximum short-term concentrations for the proposed project, the modeling approach was divided into screening and refined phases to reduce the computation time required to perform the modeling analysis. For this study, the only difference between the two modeling phases is the density of the receptor grid spacing employed when predicting concentrations. Concentrations are predicted for the screening phase using a coarse receptor grid and a 5-year meteorological data record.

If the original screening analysis indicates that the highest concentrations are occurring in a selected area(s) of the grid and, if the area's total coverage is too vast to directly apply a refined receptor grid, then an additional screening grid(s) will be used over that area. The additional screening grid(s) will employ a greater receptor density than the original screening grid.

Refinements of the maximum predicted concentrations are typically performed for the receptors of the screening receptor grid at which the highest and/or HSH concentrations occurred over the 5-year period. Generally, if the maximum concentration from other years in the screening analysis are within 10 percent of the overall maximum concentration, then those other concentrations are refined

as well. Typically, if the highest and HSH concentrations are in different locations, concentrations in both areas are refined.

A more detailed description of the model, along with the emission inventory, meteorological data, and screening receptor grids, is presented in the following sections.

## 6.2 SIGNIFICANT IMPACT ANALYSIS

FDEP policies stipulate that the highest annual average and highest short-term (i.e., 24 hours or less) concentrations are to be compared to the applicable significant impact levels both in the vicinity of the project and at the PSD Class I area. Based on the screening modeling analysis results for the vicinity of the project, additional modeling refinements are performed, if necessary, to obtain the maximum concentration with a receptor grid spacing of 100 meters (m) or less.

In this analysis, two sources, one representing the two PBPC cogeneration boilers, and the other representing the package boiler were modeled to represent the proposed future case at PBPC. Current actual emissions from the Osceola Farms sugar mill boilers were also modeled in the significant impact analysis, since these boilers will be shutdown as part of the proposed project.

Additional modeling analysis was performed to evaluate the simultaneous operation of the PBCP cogeneration boilers, package boiler, and the Osceola Farms sugar mill boilers. The fugitive $PM_{10}$ emissions (i.e., biomass handling and fly ash handling) were not modeled since the emissions were very small (i.e., <3 TPY) and the simultaneous operation represents a temporary situation. The analysis provides reasonable assurance that the simultaneous operations will not cause or contribute to a violation of any AAQS or allowable PSD increment.

## 6.3 AAQS AND PSD CLASS II ANALYSES

For each pollutant for which a significant impact is predicted in the vicinity of the project, AAQS and PSD Class II analyses are required. The AAQS analysis is a cumulative source analysis that evaluates whether the post-project concentrations from all sources will comply with the AAQS. All sources include the post-project source configuration at the project site, the impacts from other nearby facility sources, plus a background concentration to account for sources not included in the modeling analysis.

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

## 6.4 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 post-project PSD increment for all increment-affecting sources located within 200 km of the PSD Class I area will comply with the allowable PSD Class I increments. All sources include the post-project PSD increment-affecting sources at the project site, plus the impacts from all PSD increment-affecting sources at other facilities. PSD increment analysis for the Class I area was not performed for the PBPC project because impacts due to the project were below the significant impact levels for all pollutants. A Class I analysis was performed for the simultaneous operation case.

## 6.5 MODEL SELECTION

The Industrial Source Complex Short-term (ISCST3, Version 00101) dispersion model (EPA, 2000) was used to evaluate the pollutant impacts due to the proposed project in areas within 50-km of the proposed facility. This model is maintained by the EPA on its internet web site, Support Center for Regulatory Air Models (SCRAM), within the Technical Transfer Network (TTN). A listing of ISCST3 model features is presented in Table 6-1. The ISCST3 model is designed to calculate hourly concentrations based on hourly meteorological data (i.e., wind direction, wind speed, atmospheric stability, ambient temperature, and mixing heights). The ISCST3 model is applicable to sources located in either flat or rolling terrain where terrain heights do not exceed stack heights. These areas are referred to as simple terrain. The model can also be applied in areas where the terrain exceeds the stack heights. These areas are referred to as complex terrain.

In this analysis, the EPA regulatory default options were used to predict all maximum impacts. The ISCST3 model can be executed in the rural or urban land use mode that affects stability dispersion coefficients, wind speed profiles, and mixing heights. Land use can be characterized based on a scheme recommended by EPA (Auer, 1978). If more than 50 percent land use within a 3-km radius around a project is classified as industrial or commercial, or high-density residential, then the urban option should be selected. Otherwise, the rural option is appropriate. Based on the land-use within a

3-km radius of the Palm Beach Power Corporation plant site (see Attachment PB-FI-C1), the rural dispersion coefficients were used in the modeling analysis. Also, since the terrain around the facility is flat to gently rolling, the simple terrain feature of the model was selected. The ISCST3 model was used to provide maximum concentrations for the annual and 24-, 8-, 3-, and 1-hour averaging times.

For predicting impacts at the ENP PSD Class I area, the California Puff (CALPUFF) modeling system was used. CALPUFF, Version 5.4 (EPA, 2000), is a Lagrangian puff model that is recommended by the FDEP, in coordination with the Federal Land Manager (FLM) for the ENP, for predicting pollutant impacts at PSD Class I areas that are beyond 50 km from a project site. The CALPUFF model was also used to assess the Project's impact on regional haze and total nitrogen and sulfur deposition levels in the Class I area.

A listing of CALPUFF model features is presented in Table 6-2. A more detailed description of the assumptions and methods used for the CALPUFF model is provided in Appendix G.

## 6.6 METEOROLOGICAL DATA

Meteorological data used in the ISCST3 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) office located at the Palm Beach International Airport (PBI). The 5-year period of meteorological data was from 1987 through 1991. The NWS office at PBI is located approximately 47 km east of the site and is the closest primary weather station to the study area considered to have meteorological data representative of the project site. The PBI station meteorological data have been approved by the FDEP and used for numerous air modeling studies submitted as part of air construction permits approved for sources located in Palm Beach County.

Meteorological data used with the CALPUFF model consist of a CALMET-developed wind field covering all of south Florida. A detailed description of the CALMET wind field is provided in Appendix G.

## 6.7 EMISSION INVENTORY

### 6.7.1 SIGNIFICANT IMPACT ANALYSIS

The significant impact analysis is used to determine pollutants for which more detailed modeling analysis are required. This analysis is also used to determine the geographic area within which other

background sources will be considered for inclusion in the modeling analysis. This are is referred to as the "screening area". The screening area extends outward 50 km from the significant impact distance.

Emissions and stack and operating parameters used in the significant impact analysis for the PBPC project are shown in Tables 6-3 and 6-4, respectively. For the proposed project, this analysis includes the future PBPC boilers, as well as the shutdown (i.e., decrease in emissions) associated with the Osceola Farms sugar mill boilers. Emissions from these boilers are modeled as negative emissions in the analysis.

The emissions and physical and operational stack parameters for each cogeneration boiler and the package boiler stacks were presented in Section 2.0. The data for the Osceola Farms sugar mill boilers were based on actual current emissions and operation. Supportive information for Osceola Farms emissions are presented in Appendix D.

Based on this analysis, the proposed PBPC project was determined to cause a significant impact for only $SO_2$. The proposed project was determined to be significant out to a distance of 4 km for the crop season and 13 km for the off-season. Based on this result, the significant impact analysis was divided into two separate analysis: one for the crop season (when Osceola Farms emissions are offsetting); and the second for the off-season (when no offsets from Osceola Farms occurs). For this analysis, the crop season consisted of the months October through March (6 months). This is reflective of the actual historical operation of the Osceola Farms mill.

### 6.7.2 AAQS AND PSD CLASS II ANALYSES

#### 6.7.2.1 Proposed PBPC Project

As described above, only $SO_2$ impacts were determined to be significant for the proposed PBPC project. The significant impact distance was determined to be 4 km for the crop season and 13 km for the off-season. To simplify the analysis, the screening area for modeling both scenarios was selected as 63 km surrounding the PBPC site. A listing of background $SO_2$ sources considered in the AAQS and PSD Class II modeling analyses and their locations relative to PBPC is provided in Table 6-5. All facilities in the screening area were evaluated using the North Carolina screening technique. Based on this technique, facilities whose annual (i.e., ton per year) emissions are less than the threshold quantity, Q, are eliminated from the modeling analysis. Q is equal to 20 x (D-SIA),

where D is the distance in km from the facility to PBPC and SIA is the distance of the proposed project's $SO_2$ significant impact area (13 km). The $SO_2$ facilities that were not eliminated in the screening analysis are available for inclusion in the AAQS and/or PSD Class II analyses. It is noted that large sources (>1,000 TPY $SO_2$) located beyond the screening area were also included in the modeling analysis.

Detailed $SO_2$ background source data that were used for the AAQS and/or PSD Class II analyses are presented in Appendix F, Table F-1. Data for non-PBPC $SO_2$ PSD sources were obtained from FDEP and were supplemented with current and historical information available within Golder.

One facility included in the analysis is U.S. Sugar's Bryant mill. For the PSD Class II increment analysis, Bryant's maximum $SO_2$ emissions were based on a fuel oil sulfur content of 1.6 percent. This sulfur content is the actual sulfur content in the fuel oil used at the mill during the last two years (refer to AORs submitted to FDEP). $SO_2$ emission rates used in the modeling for Bryant are shown in Appendix F, Table F-1.

#### 6.7.2.2 Simultaneous Operation

As described above, only $SO_2$ impacts were determined to be significant for the proposed project. However, additional modeling was performed to address simultaneous operation. During simultaneous operation of the PBPC boilers and the Osceola Farms sugar mill boilers, all boilers could be operating at maximum for a short-term period. However, if steam production at PBPC exceeds 13,680,000 pounds of steam on a day, steam production from the sugar mill boilers will be decreased by an equivalent amount. To be conservative in the simultaneous operation modeling, it was assumed the PBPC boilers and the sugar mill boilers were all operating at maximum for the short-term averaging times. Simultaneous operation will only occur during the crop season.

To analyze this scenario, the impact distance (4 km) determined for the proposed project was used. In addition, the same screening area of 63 km was used. The maximum $SO_2$, $NO_x$, CO, and $PM_{10}$ emissions for the Osceola Farms boilers that were used in the AAQS and PSD Class II modeling for simultaneous operations are presented in Tables 6-6, 6-7, and 6-8. These are based on maximum operating rates, fuel usage rates, and emission rates.

The emission rates for the cogeneration boilers and package boiler used in the AAQS and PSD Class II modeling analyses for simultaneous operation are presented in Table 6-9, based on the information in Section 2.0.

Simultaneous operations will only occur for up to 2,880 hours over a calendar year, but they will only occur during the sugar cane processing season, because the Osceola Farms sugar mill boilers are shutdown during the off-season. To properly simulate this situation, the PBPC boilers were assumed to operate year-around, while the Osceola Farms sugar mill boilers were assumed to operate only during the sugar cane processing season, from October through April. To obtain appropriate annual concentrations for $SO_2$, $PM_{10}$, and $NO_x$, separate crop-season and off-season scenarios were run, and the results added together (maximum impact from both scenarios).

A listing of background $SO_2$ sources considered for use in the AAQS and PSD Class II modeling analyses for simultaneous operations is the same as that used for the proposed project, as shown in Table 6-5 and Appendix F, Table F-1.

A listing of background $NO_x$, $PM_{10}$, and CO sources used in the AAQS and PSD Class II modeling analyses for simultaneous operation, and their locations relative to PBPC, are provided in Tables 6-10, 6-11, and 6-12, respectively. All facilities within 63 km of PBPC were considered for use in the modeling analyses. The North Carolina screening technique was used to eliminate small sources.

Detailed $SO_2$, $NO_x$, $PM_{10}$, and CO background source data that were used for the AAQS and/or PSD Class II analyses are presented in Appendix F, Tables F-1 through F-4. Non-PBPC $SO_2$, $PM_{10}$, and $NO_x$ PSD sources were obtained from FDEP and were supplemented with current and historical information available within Golder.

### 6.7.3 CLASS I AREA

PBPC and Osceola Farms emissions and stack parameters for the Class I analysis are the same as for the Class II analysis, and are presented in Tables 6-3 through 6-9. Impacts for the proposed PBPC boilers only (without considering any offsets from Osceola Farms) were compared to both the proposed EPA Class I significance levels and the regional haze degradation criteria of 5 percent.

The analysis showed that significant impacts due to the PBPC boilers occurred for $SO_2$ only for the 3-hour and 24-hour averaging times. Therefore, a full PSD Class I analysis for $SO_2$ was performed for these averaging times. A listing of background $SO_2$ sources considered for use in the PSD Class I modeling analyses is shown in Table 6-13. This inventory is very similar to the inventory used in the AAQS/PSD Class II analysis, but contains all PSD sources within 150 km of the ENP. Detailed $SO_2$ background source data that were used for the PSD Class I analyses are presented in Appendix F.

The project's impacts of $SO_2$, $NO_x$, CO, F, Pb, and SAM were used to assess the proposed project's impacts on AQRVs in the ENP. This included regional haze and deposition analysis. The emission rates for $SO_2$, SAM, and $NO_x$ that were used in the regional haze and deposition modeling analysis for the project and for simultaneous operation were presented in Tables 6-3 through 6-9. The $PM_{10}$ emission rates used in the regional haze modeling analysis are presented in Table 6-14.

## 6.8 RECEPTOR LOCATIONS

### 6.8.1 SITE VICINITY

The modeling origin (0,0) was based on the midpoint between the PBPC Cogeneration Boiler Nos. 1 and 2 stack locations. To determine the $SO_2$, $NO_x$ and CO significant impact area for the proposed project and for simultaneous operations, concentrations were predicted using polar receptor grids. The receptor grids were comprised of 36 radials, spaced at 10-degree intervals and began at the plant property and extended out to 30 km. An additional 182 Cartesian grid receptors, spaced at 100 m, were used to predict impacts along the fence line areas. A listing of the fence line receptors is presented in Table 6-15.

At the off-property areas between the fence line and the innermost ring distance of 4.0 km, 67 discrete polar receptors were used, spaced at 10-degree intervals and at distances of 1.5, 2.0, 3.0, and 4.0 km from the origin.

Based on the results of the significant impact analysis, a maximum receptor distance of 4 km was used for $SO_2$ for the screening grids for the AAQS and PSD Class II analyses for the crop-season (based on the 24-hour averaging time). For the off-season modeling, the maximum receptor distance was 13 km. The receptor locations out to 13 km from the facility, along with the plant property boundary and the modeling origin, are depicted in Figure 6-1.

For simultaneous operation modeling for $NO_x$, $PM_{10}$, and CO, a maximum receptor distance of 4 km was also used for the screening grids for the AAQS and PSD Class II analyses.

### 6.8.2 CLASS I AREA

$SO_2$, $NO_x$, SAM, $PM_{10}$, F, CO and Pb concentrations were predicted at the ENP with the CALPUFF model, using 126 discrete receptors located along the border of the ENP PSD Class I area. A listing of Class I receptors used in the modeling analysis is provided in Table 6-16.

## 6.9 BACKGROUND CONCENTRATIONS

To estimate total air quality concentrations in the site vicinity, a background concentration must be added to the AAQS modeling results. The background concentration is considered to be the air quality concentration contributed by sources not explicitly included in the modeling evaluation.

The derivation of the background concentration for the modeling analysis was presented in Section 4.0. Based on this analysis, the background concentrations were determined to be as follows:

| | |
|---|---|
| $SO_2$: | 5 $\mu g/m^3$, annual average |
| | 13 $\mu g/m^3$, 24-hour average |
| | 47 $\mu g/m^3$, 3-hour average |
| $NO_x$: | 30 $\mu g/m^3$, annual average |
| CO: | 4,600 $\mu g/m^3$, 1-hour average |
| | 3,220 $\mu g/m^3$, 8-hour average |

These background levels were added to model-predicted concentrations to estimate total air quality levels for comparison to AAQS.

## 6.10 BUILDING DOWNWASH EFFECTS

All significant building structures within PBPC's plant area and within Osceola Farms' existing plant area were determined by a site plot plan. Plot plans of the two facilities were presented in Section 2.0. A listing of dimensions for each structure is presented in Table 6-17. As shown, there were only two significant structures identified: the PBPC boiler building, and the Osceola Farms fabrication building.

All building structures were processed in the EPA Building Input Profile (BPIP, Version 95086) program to determine direction-specific building heights and widths for each 10-degree azimuth direction for each source included in the modeling analysis. A graphical depiction of the building structures and stack locations, as well as the modeling origin, is presented in Figure 6-2.

Table 6-1. Major Features of the ISCST3 Model

| ISCST3 Model Features |
|---|
| • Polar or Cartesian coordinate systems for receptor locations |
| • Rural or one of three urban options which affect wind speed profile exponent, dispersion rates, and mixing height calculations |
| • Plume rise due to momentum and buoyancy as a function of downwind distance for stack emissions (Briggs, 1969, 1971, 1972, and 1975; Bowers, et al., 1979). |
| • Procedures suggested by Huber and Snyder (1976); Huber (1977); and Schulman and Scire (1980) for evaluating building wake effects |
| • Procedures suggested by Briggs (1974) for evaluating stack-tip downwash |
| • Separation of multiple emission sources |
| • Consideration of the effects of gravitational settling and dry deposition on ambient particulate concentrations |
| • Capability of simulating point, line, volume, area, and open pit sources |
| • Capability to calculate dry and wet deposition, including both gaseous and particulate precipitation scavenging for wet deposition |
| • Variation of wind speed with height (wind speed-profile exponent law) |
| • Concentration estimates for 1 hour to annual average times |
| • Terrain-adjustment procedures for elevated terrain including a terrain truncation algorithm for ISCST3; a built-in algorithm for predicting concentrations in complex terrain |
| • Consideration of time-dependent exponential decay of pollutants |
| • The method of Pasquill (1976) to account for buoyancy-induced dispersion |
| • A regulatory default option to set various model options and parameters to EPA recommended values (see text for regulatory options used) |
| • Procedure for calm-wind processing including setting wind speeds less than 1 m/s to 1 m/s. |

Note: ISCST3 = Industrial Source Complex Short-Term.

References:

Bowers, J.F., J.R. Bjorklund and C.S. Cheney. 1979. Industrial Source Complex (ISC) Dispersion Model User's Guide. Volume I, EPA-450/4-79-030; Volume II. EPA-450/4-79-031. U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Briggs, G.A. 1969. Plume Rise, USAEC Critical Review Series, TID-25075. National Technical Information Service, Springfield, Virginia 22161.

Briggs, G.A. 1972. Discussion on Chimney Plumes in Neutral and Stable Surroundings. *Atmos. Environ.*, Q, 507-510.

Briggs, G.A. 1974. Diffusion Estimation for Small Emissions. *In*: ERL, ARL USAEC Report ATDL-106. U.S. Atomic Energy Commission, Oak Ridge, Tennessee.

Briggs, G.A. 1975. Plume Rise Predications. In Lectures on Air Pollution and Environmental Impact Analysis. American Meteorological Society, Boston, Massachusetts.

Briggs, G.A. 1979. Some Recent Analyses of Plume Rise Observations. *In*: Proceedings of the Second International Clean Air Congress. Academic Press, New York.

Huber, A.H. 1977. Incorporating Building/Terrain Wake Effects on Stack Effluents. Preprint Volume for the Joint Conference on Applications of Air Pollution Meteorology, American Meteorological Society, Boston, Massachusetts.

Huber, A.H. and W.H. Snyder. 1976. Building Wake Effects on Short Stack Effluents. Preprint Volume for the Third Symposium on Atmospheric Diffusion and Air Quality, American Meteorological Society, Boston, Massachusetts.

Pasquill, F. 1976. Atmospheric Dispersion Parameters in Gaussian Plume Modeling - Part II. Possible Requirements for Change in the Turner Workbook Values. EPA-600/4-76-030b, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711.

Schulman, L.L. and J.S. Scire. 1980. Buoyant Line and Point Source (BLP) Dispersion Model User's Guide. Document P-7304B, Environmental Research and Technology, Inc., Concord, MA.

Table 6-2. Major Features of the CALPUFF Model, Version 5.4

| CALPUFF Model Features |
|---|
| • Source types: Point, line (including buoyancy effects), volume, area (buoyant, non-buoyant)<br>• 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)<br>• Efficient sampling function (integrated puff formulation; elongated puff (slug) formation)<br>• 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)<br>• Vertical wind shear (puff splitting; differential advection and dispersion)<br>• Plume rise (buoyant and momentum rise; stack-tip effects; building downwash effects; partial plume penetration above mixing layer)<br>• Building downwash effects (Huber-Snyder method; Schulman-Scire method)<br>• 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)<br>• Subgrid scale complex terrain (CTSG option) (CTDM flow module; dividing streamline as in CTDMPLUS)<br>• Dry deposition (gases and particles; options for diurnal cycle per pollutant, space and time variations with a resistance model, or none)<br>• 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)<br>• 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)<br>• Wet removal (scavenging coefficient approach; removal rate as a function of precipitation intensity and type)<br>• Graphical user interface<br>• Interface utilities (scan ISCST3 and AUSPLUME meteorological data files for problems; translate ISCST3 and AUSPLUME input files to CALPUFF input files |

Note: CALPUFF = California Puff Model
Source: EPA, 2000.

Table 6-4. Summary of Osceola Farms Company Stack Parameters[a] Used in the Significant Impact Modeling Analysis

| | | Relative Location[b] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | | Y | | Stack Height | | Stack Diameter | | Flow Rate | Temperature | | Velocity | |
| Source | ISCST3 ID | ft | m | ft | m | ft | m | ft | m | acfm | °F | K | ft/s | m/s |
| Sugar Mill Boiler No. 2 | OSBLR2C | 538 | 164 | -164 | -50 | 90 | 27.4 | 5.0 | 1.52 | 61,165 | 155 | 341 | 51.92 | 15.82 |
| Sugar Mill Boiler No. 3 | OSBLR3C | 541 | 165 | -118 | -36 | 90 | 27.4 | 6.3 | 1.91 | 101,841 | 156 | 342 | 55.33 | 16.86 |
| Sugar Mill Boiler No. 4 | OSBLR4C | 502 | 153 | -75 | -23 | 90 | 27.4 | 6.0 | 1.83 | 92,807 | 153 | 340 | 54.71 | 16.67 |
| Sugar Mill Boiler No. 5a | OSBLR5AC | 492 | 150 | -20 | -6 | 90 | 27.4 | 5.0 | 1.52 | 63,689 | 152 | 340 | 54.06 | 16.48 |
| Sugar Mill Boiler No. 5b | OSBLR5BC | 545 | 166 | -3 | -1 | 90 | 27.4 | 5.0 | 1.52 | 56,119 | 155 | 341 | 47.64 | 14.52 |
| Sugar Mill Boiler No. 6 | OSBLR6C | 430 | 131 | -128 | -39 | 90 | 27.4 | 6.2 | 1.88 | 107,041 | 154 | 341 | 59.67 | 18.19 |

[a] Parameters based on 2001 stack tests (24-hour average).

[b] Relative to the modeling origin, i.e., the midpoint between the two (0,0) cogen boiler stacks.

Table 6-4. Summary of Osceola Farms Company Stack Parameters[a] Used in the Significant Impact Modeling Analysis

| | | Relative Location[b] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | X | | Y | | Stack Height | | Stack Diameter | | Flow Rate | Temperature | | Velocity | |
| Source | ISCST3 ID | ft | m | ft | m | ft | m | ft | m | acfm | °F | K | ft/s | m/s |
| Sugar Mill Boiler No. 2 | OSBLR2C | 538 | 164 | -164 | -50 | 90 | 27.43 | 5.0 | 1.52 | 61,165 | 155 | 341 | 51.92 | 15.82 |
| Sugar Mill Boiler No. 3 | OSBLR3C | 541 | 165 | -118 | -36 | 90 | 27.43 | 6.3 | 1.91 | 101,841 | 156 | 342 | 55.33 | 16.86 |
| Sugar Mill Boiler No. 4 | OSBLR4C | 502 | 153 | -75 | -23 | 90 | 27.43 | 6.0 | 1.83 | 92,807 | 153 | 340 | 54.71 | 16.67 |
| Sugar Mill Boiler No. 5a | OSBLR5AC | 492 | 150 | -20 | -6 | 90 | 27.43 | 5.0 | 1.52 | 63,689 | 152 | 340 | 54.06 | 16.48 |
| Sugar Mill Boiler No. 5b | OSBLR5BC | 545 | 166 | -3 | -1 | 90 | 27.43 | 5.0 | 1.52 | 56,119 | 155 | 341 | 47.64 | 14.52 |
| Sugar Mill Boiler No. 6 | OSBLR6C | 430 | 131 | -128 | -39 | 90 | 27.43 | 6.2 | 1.88 | 107,041 | 154 | 341 | 59.67 | 18.19 |

[a] Parameters based on 2001 stack tests (24-hour average).

[b] Relative to the modeling origin, i.e., the midpoint between the two (0,0) cogen boiler stacks.

Table 6-5. Summary of $SO_2$ Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analyses

| AIRS Number | Facility | County | UTM Coordinates East (km) | UTM Coordinates North (km) | Relative to Palm Beach Power [a] X (km) | Relative to Palm Beach Power [a] Y (km) | Relative to Palm Beach Power [a] Distance (km) | Relative to Palm Beach Power [a] Direction (deg) | Maximum $SO_2$ Emissions (TPY) | Q, Emission Threshold [b] (Dist - SIA) x 20 | Include in Modeling Analysis ? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990019 | Osceola Farms | Palm Beach | 544.2 | 2968.0 | -0.2 | 0.6 | 0.6 | 0 | 1,467 | SIA | YES |
| 0990061 | U.S. Sugar -Bryant | Palm Beach | 537.8 | 2969.1 | -6.6 | 1.7 | 6.8 | 284 | 2,698 | SIA | YES |
| 0990026 | Sugar Cane Growers | Palm Beach | 534.9 | 2953.3 | -9.5 | -14.1 | 17.0 | 214 | 2,555 | 80.0 | YES |
| 0990594 | El Paso Belle Glade Generating Station | Palm Beach | 533.5 | 2954.1 | -10.9 | -13.3 | 17.2 | 219 | 69 | 83.9 | NO |
| 0990021 | Pratt & Whitney (United Technologies) | Palm Beach | 562.0 | 2960.0 | 17.6 | -7.4 | 19.1 | 113 | 504 | 121.8 | YES |
| 0850102 | Bechtel Indiantown | Martin | 545.6 | 2991.5 | 1.2 | 24.1 | 24.1 | 3 | 2,629 | 222.6 | YES |
| 0990016 | Atlantic Sugar | Palm Beach | 552.9 | 2945.2 | 8.5 | -22.2 | 23.8 | 159 | 954 | 215.4 | YES |
| 0990086 | Glades Correctional Institute | Palm Beach | 523.4 | 2955.2 | -21.0 | -12.2 | 24.3 | 240 | 98 | 225.7 | NO |
| 0850001 | FPL - Martin | Martin | 543.1 | 2992.9 | -1.3 | 25.5 | 25.5 | 357 | 22,982 | 250.7 | YES |
| 0990349 | South Florida WMD--Pump Stn. G-310/S-6 | Palm Beach | 554.2 | 2940.5 | 9.8 | -26.9 | 28.6 | 160 | 5 | 312.6 | NO |
| 0990332 | New Hope Power Partnership (Okeelanta) | Palm Beach | 524.1 | 2940.0 | -20.3 | -27.4 | 34.1 | 217 | 403 | 422.0 | NO |
| 0990005 | Okeelanta | Palm Beach | 525.0 | 2937.4 | -19.4 | -30.0 | 35.7 | 213 | 39 | 454.5 | NO |
| 0510001 | Everglades Sugar | Hendry | 509.6 | 2954.2 | -34.8 | -13.2 | 37.2 | 249 | 1,216 | 484.4 | YES |
| 0510003 | U.S. Sugar Clewiston | Hendry | 506.1 | 2956.9 | -38.3 | -10.5 | 39.7 | 255 | 7,806 | 534.3 | YES |
| 0990234 | Palm Beach Resource Recovery | Palm Beach | 585.8 | 2960.2 | 41.4 | -7.2 | 42.0 | 100 | 1,533 | 580.4 | YES |
| 0850021 | Stuart Contracting | Martin | 575.2 | 3006.8 | 30.8 | 39.4 | 50.0 | 38 | 100 | 740.2 | NO |
| 0990042 | FPL -Riviera Beach | Palm Beach | 594.2 | 2960.6 | 49.8 | -6.8 | 50.3 | 98 | 73,475 | 745.2 | YES |
| 1110103 | CPV Cana, LTD. | St. Lucie | 550.9 | 3018.1 | 6.5 | 50.7 | 51.1 | 7 | 76 | 762.3 | NO |
| 0990045 | Lake Worth Utilities | Palm Beach | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 7,415 | 817.8 | YES |
| 0990568 | Lake Worth Generating | Palm Beach | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 54 | 817.8 | NO |
| 0510015 | Southern Gardens Citrus | Hendry | 487.6 | 2957.6 | -56.8 | -9.8 | 57.6 | 260 | 409 | 892.8 | NO |
| 0112534 | Enron/Deerfield Beach Energy Center | Broward | 583.1 | 2907.9 | 38.7 | -59.5 | 71.0 | 147 | 166 | 1159.6 | NO |
| 0112545 | El Paso Broward Energy Center | Broward | 583.3 | 2908.0 | 38.9 | -59.4 | 71.0 | 147 | 87 | 1160.1 | NO |
| 1110003 | Fort Pierce Utilities [c] | St. Lucie | 566.8 | 3036.3 | 22.4 | 68.9 | 72.4 | 18 | 1,497 | 1189.0 | YES |
| 0110120 | North Broward Resource Recovery | Broward | 583.6 | 2907.6 | 39.2 | -59.8 | 71.5 | 147 | 896 | 1170.1 | NO |
| 0112515 | Enron/Pompano Energy Center | Broward | 583.7 | 2905.5 | 39.3 | -61.9 | 73.3 | 148 | 166 | 1206.4 | NO |
| 0990350 | South Florida WMD--Pump Stn. S-9 | Broward | 555.9 | 2882.2 | 11.5 | -85.2 | 86.0 | 172 | 2 | 1459.3 | NO |
| 0610029 | Vero Beach Power [c] | St. Lucie | 567.1 | 3056.5 | 22.7 | 89.1 | 91.9 | 14 | 10,274 | 1578.9 | YES |
| 0112119 | South Broward Resource Recovery [c] | Broward | 579.6 | 2883.3 | 35.2 | -84.1 | 91.2 | 157 | 1,318 | 1563.4 | YES |
| 0110037 | FPL -Lauderdale [c] | Broward | 580.1 | 2883.3 | 35.7 | -84.1 | 91.4 | 157 | 47,858 | 1567.3 | YES |
| 0110036 | FPL -Port Everglades [c] | Broward | 587.4 | 2885.3 | 43.0 | -82.1 | 92.7 | 152 | 170,215 | 1593.6 | YES |
| 0550018 | TECO-Phillips [c] | Highlands | 464.3 | 3035.4 | -80.1 | 68.0 | 105.1 | 310 | 4,053 | 1841.4 | YES |
| 0250020 | Tarmac [c] | Dade | 562.9 | 2861.7 | 18.5 | -105.7 | 107.3 | 170 | 2,792 | 1886.1 | YES |
| 0250348 | Dade Co. Resource Recovery | Dade | 564.3 | 2857.4 | 19.9 | -110.0 | 111.8 | 170 | 857 | 1975.7 | NO |
| 0550004 | TECO-Sebring/Dinner Lake [c] | Highlands | 456.8 | 3042.5 | -87.6 | 75.1 | 115.4 | 311 | 1,313 | 2047.7 | YES |
| 0710019 | Lee County Resource Recovery | Lee | 424.2 | 2945.7 | -120.2 | -21.7 | 122.1 | 260 | 163 | 2182.9 | NO |
| 0710000 | FPL - Fort Myers [c] | Lee | 422.1 | 2952.9 | -122.3 | -14.5 | 123.2 | 263 | 22,702 | 2203.1 | YES |

Note: deg = degrees
km = kilometers
SIA = significant impact area
TPY = tons per year

[a] Palm Beach Power's East and North Coordinates (km) are: 544.4 and 2967.4 , respectively.

[b] Based on North Carolina Screening Technique for annual average basis. "Dist" is the distance the facility is located from the project. "SIA" is the significant impact area. The project's 24-hour $SO_2$ concentrations are predicted to be significant out to 13 km from the project.

[c] Large source with annual emissions greater than 1,000 TPY located beyond the screening area (63 km) that were included in the inventory.

Table 6-6. Maximum $SO_2$ Emissions for Osceola Farms Used in the Simultaneous Operations Modeling Analysis

| Boiler No. | Maximum Steam Rate (lb/hr) | Total Maximum Heat Input (MMBtu/hr) | Maximum Heat Input From Fuel Oil[a] (MMBtu/hr) | Rates Used For Modeling Purposes: Steam Rate (lb/hr) | Total Heat Input (MMBtu/hr) | Fuel Oil gal/hr[b] | Fuel Oil MMBtu/hr | Bagasse (MMBtu/hr) | Modeled $SO_2$ Emissions: Fuel Oil[b] (lb/hr) | Bagasse[c] (lb/hr) | Total (lb/hr) | Total (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | MAXIMUM 3-HR | | | | | | | |
| 2 | 140,000 | 280 | 82.5 | 140,000 | 280 | 550 | 82.5 | 197.5 | 88.0 | 11.9 | 99.9 | 12.58 |
| 3 | 150,000 | 292 | 75.4 | 150,000 | 292 | 400 | 60.0 | 232.0 | 64.0 | 13.9 | 77.9 | 9.82 |
| 4 | 140,000 | 280 | 82.5 | 140,000 | 280 | 400 | 60.0 | 220.0 | 64.0 | 13.2 | 77.2 | 9.73 |
| 5 | 169,000 | 330 | 82.5 | 169,000 | 330 | 550 | 82.5 | 247.5 | 88.0 | 14.9 | 102.9 | 12.96 |
| 6 | 195,000 | 379 | 75.4 | 195,000 | 379 | 0 | 0.0 | 379.0 | 0.0 | 22.7 | 22.7 | 2.87 |
| Totals | 794,000 | 1,561 | 398.3 | 794,000 | 1,561 | 1,900 (1,900 gal/hr) | 285.0 | 1,276.0 | 304.0 | 76.6 | 380.6 | 48.0 |
| | | | | | MAXIMUM 24-HR | | | | | | | |
| 2 | 140,000 | 280 | 82.5 | 127,000 | 254 | 500 | 75.0 | 179.0 | 80.0 | 10.7 | 90.7 | 11.43 |
| 3 | 150,000 | 292 | 75.4 | 136,000 | 265 | 0 | 0.0 | 264.7 | 0.0 | 15.9 | 15.9 | 2.00 |
| 4 | 140,000 | 280 | 82.5 | 127,000 | 254 | 0 | 0.0 | 254.0 | 0.0 | 15.2 | 15.2 | 1.92 |
| 5 | 169,000 | 330 | 82.5 | 154,000 | 301 | 500 | 75.0 | 225.7 | 80.0 | 13.5 | 93.5 | 11.79 |
| 6 | 195,000 | 379 | 75.4 | 176,000 | 342 | 0 | 0.0 | 342.1 | 0.0 | 20.5 | 20.5 | 2.59 |
| Totals | 794,000 | 1,561 | 398.3 | 720,000 (17,280,000 lb/24-hr) | 1,416 | 1,000 (24,000 gallons per 24-hour period) | 150.0 | 1,265.5 | 160.0 | 75.9 | 235.9 | 29.7 |

[a] Based on maximum capacity of fuel oil burners.

[b] No. 6 fuel oil @ 150,000 Btu/gal; 8.0 lb/gal; 1.0% sulfur.

[c] Based on 0.06 lb/MMBtu $SO_2$ due to bagasse firing, based on industry test data.

Table 6-7. Maximum $NO_x$ and CO Emissions for Osceola Farms Used in the Simultaneous Operations Modeling Analysis

| Source | Maximum Heat Input (MMBtu/hr) | Emission Factor | Emissions (lb/hr) | Emissions (g/s) |
|---|---|---|---|---|
| MAXIMUM ANNUAL $NO_x$ EMISSIONS | | | | |
| Boiler No. 2 | 280 | 0.19 lb/MMBtu | 54.5 | 6.86 |
| Boiler No. 3 | 292 | 0.45 lb/MMBtu | 131.4 | 16.56 |
| Boiler No. 4 | 280 | 0.17 lb/MMBtu | 48.2 | 6.07 |
| Boiler No. 5 | 330 | 0.21 lb/MMBtu | 68.3 | 8.61 |
| Boiler No. 6 | 379 | 0.16 lb/MMBtu | 60.6 | 7.64 |
| MAXIMUM 1-HR AND 8-HR CO EMISSIONS | | | | |
| Boiler No. 2 | 280 | 13.0 lb/MMBtu | 3,640.0 | 458.64 |
| Boiler No. 3 | 292 | 3.5 lb/MMBtu | 1,022.0 | 128.77 |
| Boiler No. 4 | 280 | 6.0 lb/MMBtu | 1,680.0 | 211.68 |
| Boiler No. 5 | 330 | 6.0 lb/MMBtu | 1,980.0 | 249.48 |
| Boiler No. 6 | 379 | 4.8 lb/MMBtu | 1,819.2 | 229.22 |

Note: $NO_x$ and CO emissions for Boiler Nos. 2, 4, and 5 are based on actual test data (2000/2001), since no allowable limits exist for these boilers.
$NO_x$ and CO emissions for Boiler Nos. 3 and 6 are based on allowable emissions for bagasse firing.

Table 6-8. Maximum $PM_{10}$ Emissions for Osceola Farms Used in the Simultaneous Operations Modeling Analysis

| Boiler | Maximum Steam Rate[a] (lb/hr) | Total Maximum Heat Input (MMBtu/hr) | Rates Used For Modeling Purposes: Steam Rate (lb/hr) | Rates Used For Modeling Purposes: Bagasse Heat Input (MMBtu/hr) | Maximum $PM_{10}$ Emissions: lb/MMBtu[b] | Maximum $PM_{10}$ Emissions: lb/hr | $PM_{10}$ Emission Factor | Maximum $PM_{10}$ Emissions: lb/hr | Maximum $PM_{10}$ Emissions: g/s |
|---|---|---|---|---|---|---|---|---|---|
| | | | | MAXIMUM 24-HR | | | | | |
| 2 | 140,000 | 280 | 140,000 | 280 | 0.17 | 48.7 | 93% of PM | 45.3 | 5.71 |
| 3 | 150,000 | 292 | 150,000 | 292 | 0.19 | 54.9 | 93% of PM | 51.1 | 6.43 |
| 4 | 140,000 | 280 | 140,000 | 280 | 0.26 | 71.4 | 93% of PM | 66.4 | 8.37 |
| 5 | 169,000 | 330 | 169,000 | 330 | 0.18 | 59.4 | 93% of PM | 55.2 | 6.96 |
| 6 | 195,000 | 379 | 121,000 | 235 | 0.14 | 32.5 | 93% of PM | 30.2 | 3.80 |
| Totals | 794,000 | 1,561 | 720,000 (17,280,000 lbs per 24-hours) | 1,417 | | 266.9 | | 248.2 | 31.27 |

[a] Based on maximum capacity of boiler.

[b] Based on the maximum emission rates from the last 5 years of stack tests (1997 - 2001).

Table 6-9. Maximum Emissions for Palm Beach Power Boilers Used in the Simultaneous Operations Modeling Analysis

| Source | Maximum Heat Input (MMBtu/hr) | Pollutant | Emission Factor[a] | | Emissions (lb/hr) | Emissions (g/s) |
|---|---|---|---|---|---|---|
| Cogeneration Boilers 1 and 2 (each) | 760 | $SO_2$: 3-hr | 0.3 | lb/MMBtu | 228.0 | 28.73 |
| | | $SO_2$: 24-hr | 0.2 | lb/MMBtu | 152.0 | 19.15 |
| | | $SO_2$: Annual | 0.06 | lb/MMBtu | 45.6 | 5.75 |
| | | $PM_{10}$ | 0.03 | lb/MMBtu | 22.8 | 2.87 |
| | | CO: 1-hr | 6.5 | lb/MMBtu | 4,940.0 | 622.44 |
| | | CO: 8-hr | 4.5 | lb/MMBtu | 3,420.0 | 430.92 |
| | | CO: Annual | 0.35 | lb/MMBtu | 266.0 | 33.52 |
| | | $NO_x$: Annual | 0.15 | lb/MMBtu | 114.0 | 14.36 |
| Package Boiler | 211[b] | $SO_2$ | 0.058 | lb/MMBtu | 11.66 | 1.469 |
| | | $PM_{10}$ | 0.032 | lb/MMBtu | 6.46 | 0.814 |
| | | CO | 0.11 | lb/MMBtu | 22.22 | 2.80 |
| | | $NO_x$: (30-day rolling average) | 0.12 | lb/MMBtu | 24.24 | 3.054 |

[a] Based on Tables 2-2, 2-3, and 2-6.

[b] Based on natural gas combustion.

Table 6-10. Summary of $NO_x$ Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analyses for Simultaneous Operations

| APIS Number | Facility | UTM Coordinates East (km) | UTM Coordinates North (km) | Relative to Palm Beach Power X (km) | Relative to Palm Beach Power Y (km) | Relative to Palm Beach Power Distance (km) | Relative to Palm Beach Power Direction (deg) | Maximum $NO_x$ Emissions (TPY) | Q, Emission Threshold (Dist -4) x 20 | Include in Modeling Analysis ? |
|---|---|---|---|---|---|---|---|---|---|---|
| 0990019 | OSCEOLA FARMS | 544.2 | 2968.0 | -0.2 | 0.6 | 0.6 | 0 | 163 | SIA | YES |
| 0990061 | U.S.SUGAR CORP. BRYANT MILL | 537.8 | 2969.1 | -6.6 | 1.7 | 6.8 | 285 | 1,984 | 56.4 | YES |
| 0990026 | SUGAR CANE GROWERS CO-OP | 534.9 | 2953.3 | -9.5 | -14.1 | 17.0 | 214 | 3,243 | 260.0 | YES |
| 0990594 | El Paso Belle Glade Generating Station | 533.5 | 2954.1 | -10.9 | -13.3 | 17.2 | 219 | 365 | 263.9 | YES |
| 0990021 | UNITED TECHNOLOGIES CORP. (PRATT & WHITNEY) | 562.0 | 2976.0 | 17.6 | 8.6 | 19.6 | 64 | 1,756 | 311.8 | YES |
| 0990530 | HUBBARD CONSTRUCTION COMPANY | 562.1 | 2955.6 | 17.7 | -11.8 | 21.3 | 124 | 30 | 346.6 | NO |
| 0850129 | AMERICAN POWER TECH, INC | 549.1 | 2990.8 | 4.7 | 23.4 | 23.9 | 11 | 10 | 397.4 | NO |
| 0850102 | INDIANTOWN COGENERATION, L.P. | 545.6 | 2991.5 | 1.2 | 24.1 | 24.1 | 3 | 2,583 | 402.6 | YES |
| 0990566 | INDIAN TRAIL IMPROVEMENT DISTRICT | 564.7 | 2956.2 | 20.3 | -11.2 | 23.2 | 119 | 22 | 383.9 | NO |
| 0990185 | SIKORSKY AIRCRAFT (PRATT & WHITNEY) | 567.5 | 2975.0 | 23.1 | 7.6 | 24.3 | 72 | 3 | 406.4 | NO |
| 0990016 | ATLANTIC SUGAR ASSOCIATION | 552.9 | 2945.2 | 8.5 | -22.2 | 23.8 | 159 | 2,266 | 395.4 | YES |
| 0990086 | GLADES CORRECTIONAL | 523.4 | 2955.2 | -21.0 | -12.2 | 24.3 | 240 | 15 | 405.7 | NO |
| 0850001 | FP&L MARTIN | 543.1 | 2992.9 | -1.3 | 25.5 | 25.5 | 357 | 35,489 | 430.7 | YES |
| 0990529 | PALM BEACH WOOD PRODUCTS, INC. | 563.5 | 2952.1 | 19.1 | -15.3 | 24.5 | 129 | 100 | 410.0 | NO |
| 0990549 | SOUTH FLORIDA WMD--PUMP STN. G-310/S-6/S-9 | 554.2 | 2940.5 | 9.8 | -27.0 | 28.7 | 160 | 396 | 493.5 | NO |
| 0990213 | JUPITER MULCH, INC. | 573.1 | 2980.1 | 28.7 | 12.7 | 31.4 | 66 | 26 | 547.6 | NO |
| 0990332 | NEW HOPE POWER PARTNERSHIP (OKEELANTA PWR.) | 524.1 | 2940.0 | -20.3 | -27.4 | 34.1 | 217 | 863 | 602.0 | YES |
| 0990005 | OKEELANTA CORP. --only Blr. 16 included in future | 525.0 | 2937.4 | -19.4 | -30.0 | 35.7 | 213 | 976 | 634.5 | YES |
| 0510001 | EVERGLADES SUGAR | 509.6 | 2954.2 | -34.8 | -13.2 | 37.2 | 249 | 1,410 | 664.4 | YES |
| 0990087 | RANGER CONSTRUCTION INDUSTRIES, INC. | 579.9 | 2951.7 | 35.5 | -15.7 | 38.8 | 114 | 24 | 696.3 | NO |
| 0990583 | MAGNUM ENVIRONMENTAL SERVICES, INC. | 580.2 | 2952.0 | 35.8 | -15.4 | 39.0 | 113 | 29 | 699.4 | NO |
| 0510003 | U.S. SUGAR CORP. CLEWISTON MILL | 506.1 | 2956.9 | -38.3 | -10.50 | 39.7 | 255 | 2,118 | 714.3 | YES |
| 0990234 | SOLID WASTE AUTHORITY OF PBC | 584.5 | 2961.3 | 40.1 | -6.1 | 40.6 | 99 | 1,766 | 731.1 | YES |
| 0990233 | MARKS LANDSCAPING & PAVING | 582.1 | 2952.3 | 37.7 | -15.1 | 40.6 | 112 | 100 | 732.2 | NO |
| 0990333 | FLORIDA GAS TRANSMISSION | 584.4 | 2957.1 | 40.0 | -10.3 | 41.3 | 104 | 78 | 745.5 | NO |
| 0990300 | PALM BEACH CO ANIMAL CARE AND CONTROL. | 582.8 | 2952.2 | 38.4 | -15.2 | 41.3 | 112 | 0 | 745.1 | NO |
| 7775057 | CRUSHER CONTRACTORS CO. | 582.5 | 2951.2 | 38.1 | -16.2 | 41.4 | 113 | 11 | 748.1 | NO |
| 0990350 | SOUTH FLORIDA WMD--PUMP STN. G-335 | 552.6 | 2922.0 | 8.2 | -45.4 | 46.1 | 170 | 197 | 842.9 | NO |
| 0990522 | PALM BEACH TRANSFER & RECYCLING,INC. | 583.7 | 2951.5 | 39.3 | -15.9 | 42.4 | 112 | 91 | 768.7 | NO |
| 0990304 | DEPARTMENT OF VETERANS AFFAIRS | 588.0 | 2963.0 | 43.6 | -4.4 | 43.8 | 96 | 2 | 796.4 | NO |
| 0990562 | SOUTH FLORIDA SHAVINGS CO. | 579.2 | 2941.1 | 34.8 | -26.3 | 43.6 | 127 | 2 | 792.4 | NO |
| 0990344 | PARKWAY ASPHALT, INC. | 588.5 | 2962.1 | 44.1 | -5.3 | 44.4 | 97 | 19 | 808.3 | NO |
| 0990188 | ANIMAL RESCUE LEAGUE | 588.6 | 2956.0 | 44.2 | -11.4 | 45.6 | 104 | 0 | 832.9 | NO |
| 0990123 | FLORIDA POWER & LIGHT (PDC/OSF) | 589.7 | 2961.2 | 45.3 | -6.2 | 45.7 | 98 | 16 | 834.4 | NO |
| 0850017 | TURBO COMBUSTOR TECHNOLOGY | 576.6 | 3004.4 | 32.2 | 37.0 | 49.0 | 41 | 1 | 900.6 | NO |
| 0990056 | ST. MARY'S HOSPITAL, INC. | 593.0 | 2959.7 | 48.6 | -7.7 | 49.2 | 99 | 11 | 904.1 | NO |
| 0850021 | STUART CONTRACTING | 575.2 | 3006.8 | 30.8 | 39.4 | 50.0 | 38 | ND | 920.2 | NO |
| 0990325 | ROYAL PALM MEMORIAL GARDENS, INC. | 593.4 | 2960.2 | 49.0 | -7.2 | 49.5 | 98 | 1 | 910.5 | NO |
| 0850015 | AYCOCK FUNERAL HOME | 573.5 | 3008.4 | 29.1 | 41.0 | 50.3 | 35 | 1 | 925.5 | NO |

Table 6-10. Summary of $NO_x$ Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analyses for Simultaneous Operations

| APIS Number | Facility | UTM Coordinates East (km) | UTM Coordinates North (km) | Relative to Palm Beach Power X (km) | Relative to Palm Beach Power Y (km) | Relative to Palm Beach Power Distance (km) | Relative to Palm Beach Power Direction (deg) | Maximum $NO_x$ Emissions (TPY) | Q, Emission Threshold (Dist -4) x 20 | Include in Modeling Analysis ? |
|---|---|---|---|---|---|---|---|---|---|---|
| 0990042 | FP&L RIVIERA [a] | 594.2 | 2960.6 | 49.8 | -6.8 | 50.3 | 98 | 16,565 | 925.2 | YES |
| 1110103 | CPV Cana, LTD. | 550.9 | 3018.1 | 6.5 | 50.7 | 51.1 | 7 | 102 | 942.3 | NO |
| 0990045 | LAKE WORTH UTILITIES [a] | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 7,025 | 997.8 | YES |
| 0990568 | LAKE WORTH GENERATION | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 395 | 997.8 | NO |
| 0510015 | SOUTHERN GARDENS CITRUS | 487.6 | 2957.6 | -56.8 | -9.8 | 57.6 | 260 | 102 | 1072.8 | NO |
| 0112534 | Enron/Deerfield Beach Energy Center | 583.1 | 2907.9 | 38.7 | -59.5 | 71.0 | 147 | 572 | 1339.6 | NO |
| 0112545 | El Paso Broward Energy Center | 583.3 | 2908.0 | 38.9 | -59.4 | 71.0 | 147 | 505 | 1340.1 | NO |
| 1110003 | FT PIERCE UTILITIES AUTHORITY [a] | 566.1 | 3036.4 | 21.7 | 68.9 | 72.3 | 17 | 1,215 | 1365.8 | YES |
| 0112120 | WHEELABRATOR NORTH BROWARD [a] | 583.9 | 2907.6 | 39.5 | -59.8 | 71.7 | 147 | 2,060 | 1353.4 | YES |
| 0112515 | Enron/Pompano Energy Center | 583.7 | 2905.4 | 39.3 | -62.0 | 73.4 | 148 | 573 | 1388.1 | NO |
| 0610029 | CITY OF VERO BEACH [a] | 561.4 | 3056.5 | 17.0 | 89.1 | 90.7 | 11 | 4,315 | 1734.1 | YES |
| 0112119 | SOUTH BROWARD RRF [a] | 579.6 | 2883.3 | 35.2 | -84.1 | 91.2 | 157 | 1,497 | 1743.4 | YES |
| 0110037 | FLORIDA POWER & LIGHT--LAUDERDALE [a] | 580.1 | 2883.3 | 35.7 | -84.1 | 91.4 | 157 | 14,025 | 1747.3 | YES |
| 0110036 | FLORIDA POWER & LIGHT--PORT EVERGLADES [a] | 587.4 | 2885.3 | 43.0 | -82.1 | 92.7 | 152 | 25,217 | 1773.6 | YES |
| 0550018 | TAMPA ELECTRIC CO.--PHILLIPS [a] | 464.3 | 3035.4 | -80.1 | 68.0 | 105.1 | 310 | 5,016 | 2021.4 | YES |
| 0250020 | TARMAC AMERICA CO. [a] | 562.9 | 2861.7 | 18.5 | -105.7 | 107.3 | 170 | 3,473 | 2066.1 | YES |
| 0250348 | MIAMI DADE RRF [a] | 563.8 | 2857.6 | 19.4 | -109.8 | 111.5 | 170 | 2,644 | 2149.7 | YES |
| 0550004 | TECO--SEBRING/DINNER LAKE | 456.8 | 3042.5 | -87.6 | 75.1 | 115.4 | 311 | 369 | 2227.7 | NO |
| 0360119 | LEE COUNTY RRF | 424.2 | 2945.7 | -120.2 | -21.7 | 122.1 | 260 | 320 | 2362.7 | NO |
| 0710002 | FP&L FORT MYERS [a] | 422.1 | 2952.9 | -122.3 | -14.5 | 123.2 | 263 | 33,272 | 2383.1 | YES |
| Palm Beach Power's Coordinates: | | | 544.4 | 2967.4 | | | | | | |

Emission inventory is limited to facilities within 54 km (project screening area).

[a] Large emission source (>1,000 TPY) outside the screening area that was included in the modeling analysis.

Table 6-11. Summary of PM Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analyses for Simultaneous Operations

| AIRS Number | Facility | County | UTM Coordinates East (km) | UTM Coordinates North (km) | Relative to Palm Beach Power [a] X (km) | Relative to Palm Beach Power [a] Y (km) | Relative to Palm Beach Power [a] Distance (km) | Relative to Palm Beach Power [a] Direction (deg) | Maximum PM Emissions (TPY) | Q, (TPY) Emission Threshold [b] (Dist - 4) x 20 | Include in Modeling Analysis ? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 990019 | Osceola Farms | Palm Beach | 544.2 | 2968.0 | -0.2 | 0.6 | 0.6 | 0 | 700 | SIA | YES |
| 990061 | U.S. Sugar -Bryant | Palm Beach | 537.8 | 2969.1 | -6.6 | 1.7 | 6.8 | 284 | 979 | 56 | YES |
| 990026 | Sugar Cane Growers | Palm Beach | 534.9 | 2953.3 | -9.5 | -14.1 | 17.0 | 214 | 1,032 | 260 | YES |
| 0990594 | El Paso Belle Glade Generating Station | Palm Beach | 533.5 | 2954.1 | -10.9 | -13.3 | 17.2 | 219 | 181 | 264 | NO |
| 990021 | Pratt & Whitney (United Technologies) | Palm Beach | 562.0 | 2976.0 | 17.6 | 8.6 | 19.6 | 64 | 121 | 312 | NO |
| 990016 | Atlantic Sugar Association | Palm Beach | 552.9 | 2945.2 | 8.5 | -22.2 | 23.8 | 159 | 684 | 395 | YES |
| 850102 | Bechtel Indiantown | Martin | 545.6 | 2991.5 | 1.2 | 24.1 | 24.1 | 3 | 270 | 403 | NO |
| 990086 | Glades Correctional Institute | Palm Beach | 523.4 | 2955.2 | -21.0 | -12.2 | 24.3 | 240 | 30 | 406 | NO |
| 850001 | FPL -Martin | Martin | 543.1 | 2992.9 | -1.3 | 25.5 | 25.5 | 357 | 7,985 | 431 | YES |
| 990332 | New Hope Power Partnership (Okeelanta) | Palm Beach | 524.1 | 2940.0 | -20.3 | -27.4 | 34.1 | 217 | 285 | 602 | NO |
| 990005 | Okeelanta | Palm Beach | 525.0 | 2937.4 | -19.4 | -30.0 | 35.7 | 213 | 22 | 635 | NO |
| 510001 | Everglades Sugar | Hendry | 509.6 | 2954.2 | -34.8 | -13.2 | 37.2 | 249 | 41 | 664 | NO |
| 510003 | US Sugar Clewiston | Hendry | 506.1 | 2956.9 | -38.3 | -10.5 | 39.7 | 255 | 2,190 | 714 | YES |
| 990350 | South Florida Water Mgmt. District | Palm Beach | 556.2 | 2927.8 | 11.8 | -39.6 | 41.3 | 163 | 17 | 746 | NO |
| 500234 | Palm Beach Resource Recovery | Palm Beach | 585.8 | 2960.2 | 41.4 | -7.2 | 42.0 | 100 | 26 | 760 | NO |
| 850021 | Stuart Contracting | Martin | 575.2 | 3006.8 | 30.8 | 39.4 | 50.0 | 38 | ND | 920 | NO |
| 500042 | FPL -Riviera Beach [c] | Palm Beach | 594.2 | 2960.6 | 49.8 | -6.8 | 50.3 | 98 | 1,670 | 925 | YES |
| 1110103 | CPV Cana, LTD. | St. Lucie | 550.9 | 3018.1 | 6.5 | 50.7 | 51.1 | 7 | 48 | 942 | NO |
| 990568 | Lake Worth Generating Station | Palm Beach | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 42 | 998 | NO |
| 500045 | Lake Worth Utilities | Palm Beach | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 326 | 998 | NO |
| 510015 | Southern Gardens Citrus | Hendry | 487.6 | 2957.6 | -56.8 | -9.8 | 57.6 | 260 | 54 | 1,073 | NO |
| 0112534 | Enron/Deerfield Beach Energy Center | Broward | 583.1 | 2907.9 | 38.7 | -59.5 | 71.0 | 147 | 55 | 1,340 | NO |
| 0112545 | El Paso Broward Energy Center | Broward | 583.3 | 2908.0 | 38.9 | -59.4 | 71.0 | 147 | 227 | 1,340 | NO |
| 112120 | North Broward Resource Recovery | Broward | 583.6 | 2907.6 | 39.2 | -59.8 | 71.5 | 147 | 100 | 1,350 | NO |
| 560003 | Fort Pierce Utilities | St. Lucie | 566.8 | 3036.3 | 22.4 | 68.9 | 72.4 | 18 | 16 | 1,369 | NO |
| 0112515 | Enron/Pompano Energy Center | Broward | 583.7 | 2905.5 | 39.3 | -61.9 | 73.3 | 148 | 41 | 1,386 | NO |
| 62119 | South Broward Resource Recovery | Broward | 579.6 | 2883.3 | 35.2 | -84.1 | 91.2 | 157 | 106 | 1,743 | NO |
| 60037 | FPL -Lauderdale | Broward | 580.1 | 2883.3 | 35.7 | -84.1 | 91.4 | 157 | 100 | 1,747 | NO |
| 310029 | Vero Beach Power | St. Lucie | 567.1 | 3056.5 | 22.7 | 89.1 | 91.9 | 14 | 687 | 1,759 | NO |
| 60036 | FPL -Port Everglades [c] | Broward | 587.4 | 2885.3 | 43.0 | -82.1 | 92.7 | 152 | 3,794 | 1,774 | YES |
| 550018 | TECO-Sebring | Highlands | 464.3 | 3035.4 | -80.1 | 68.0 | 105.1 | 310 | 110 | 2,021 | NO |
| 130020 | Tarmac | Dade | 562.9 | 2861.7 | 18.5 | -105.7 | 107.3 | 170 | 910 | 2,066 | NO |
| 0250348 | Miami-Dade RRF/Montenay | Dade | 563.8 | 2857.6 | 19.4 | -109.8 | 111.5 | 170 | 116 | 2,230 | NO |
| 0550004 | TECO-Sebring/Dinner Lake | Highlands | 456.8 | 3042.5 | -87.6 | 75.1 | 115.4 | 311 | 110 | 2,228 | NO |
| 360119 | Lee County Resource Recovery | Lee | 424.0 | 2946.0 | -120.4 | -21.4 | 122.3 | 260 | 28 | 2,366 | NO |
| 710002 | FPL - Fort Myers [c] | Lee | 422.1 | 2952.9 | -122.3 | -14.5 | 123.2 | 263 | 1,627 | 2,383 | YES |

ND = No data available

[a] Palm Beach Power's East and North Coordinates (km) 544.4 2967.4

[b] Emission inventory is limited to facilities within 54 km of the PBPC facility.

[c] Large source (>1,000 TPY) beyond screening area included in modeling analysis.

Table 6-12. Summary of CO Facilities Considered for Inclusion in the AAQS and PSD Class II Air Modeling Analyses for Simultaneous Operations

| AIRS Number | Facility | County | UTM Coordinates East (km) | UTM Coordinates North (km) | Relative to Palm Beach Power [a] X (km) | Relative to Palm Beach Power [a] Y (km) | Relative to Palm Beach Power [a] Distance (km) | Relative to Palm Beach Power [a] Direction (deg) | Maximum CO Emissions (TPY) | Q, (TPY) Emission Threshold [b] (Dist - 4) x 20 | Include in Modeling Analysis ? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990061 | U.S. Sugar -Bryant | Palm Beach | 537.8 | 2969.1 | -6.6 | 1.7 | 6.8 | 284 | 19,958 | 56.3 | YES |
| 0990026 | Sugar Cane Growers | Palm Beach | 534.9 | 2953.3 | -9.5 | -14.1 | 17.0 | 214 | 33,771 | 260.0 | YES |
| 0990594 | El Paso Belle Glade Generating Station | Palm Beach | 533.5 | 2954.1 | -10.9 | -13.3 | 17.2 | 219 | 100 | 263.9 | NO |
| 0990021 | Pratt & Whitney (United Technologies) | Palm Beach | 562.0 | 2976.0 | 17.6 | 8.6 | 19.6 | 64 | 1,000[d] | 311.8 | YES |
| 0850102 | Bechtel Indiantown | Martin | 545.6 | 2991.5 | 1.2 | 24.1 | 24.1 | 3 | 1,651 | 402.6 | YES |
| 0990016 | Atlantic Sugar Association | Palm Beach | 552.9 | 2945.2 | 8.5 | -22.2 | 23.8 | 159 | 25,065 | 395.4 | YES |
| 0990086 | Glades Correctional Institute | Palm Beach | 523.4 | 2955.2 | -21.0 | -12.2 | 24.3 | 240 | 10 | 405.7 | NO |
| 0850001 | FPL -Martin | Martin | 543.1 | 2992.9 | -1.3 | 25.5 | 25.5 | 357 | 2,285 | 430.7 | YES |
| 0990332 | New Hope Power (Okeelanta Power) | Palm Beach | 524.1 | 2940.0 | -20.3 | -27.4 | 34.1 | 217 | 2,013 | 602.0 | YES |
| 0990005 | Okeelanta | Palm Beach | 525.0 | 2937.4 | -19.4 | -30.0 | 35.7 | 213 | 141 | 634.5 | NO |
| 0510001 | Everglades Sugar | Hendry | 509.6 | 2954.2 | -34.8 | -13.2 | 37.2 | 249 | 15 | 664.4 | NO |
| 0510003 | U.S. Sugar Clewiston | Hendry | 506.1 | 2956.9 | -38.3 | -10.5 | 39.7 | 255 | 64,644 | 714.3 | YES |
| 0990349 | South Florida WMD-Pump Stn. G-310/S-6/G-335 | Palm Beach | 556.2 | 2927.8 | 11.8 | -39.6 | 41.3 | 163 | 131 | 746.4 | NO |
| 0990234 | Palm Beach Resource Recovery | Palm Beach | 585.8 | 2960.2 | 41.4 | -7.2 | 42.0 | 100 | 1,733 | 760.4 | YES |
| 0850021 | Stuart Contracting | Martin | 575.2 | 3006.8 | 30.8 | 39.4 | 50.0 | 38 | ND | 920.2 | NO |
| 0990042 | FPL -Riviera Beach | Palm Beach | 594.2 | 2960.6 | 49.8 | -6.8 | 50.3 | 98 | 1,156 | 925.2 | YES |
| 1110103 | CPV Cana, LTD. | St. Lucie | 550.9 | 3018.1 | 6.5 | 50.7 | 51.1 | 7 | 170 | 942.3 | NO |
| 0500045 | Lake Worth Utilities | Palm Beach | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 204 | 997.8 | NO |
| 0990568 | Lake Worth Generating | Palm Beach | 592.8 | 2943.7 | 48.4 | -23.7 | 53.9 | 116 | 177 | 997.8 | NO |
| 0510015 | Southern Gardens Citrus [c] | Hendry | 487.6 | 2957.6 | -56.8 | -9.8 | 57.6 | 260 | 2,892 | 1072.8 | YES |
| 0112534 | Enron/Deerfield Beach Energy Center | Broward | 583.1 | 2907.9 | 38.7 | -59.5 | 71.0 | 147 | 171 | 1339.6 | NO |
| 0112545 | El Paso Broward Energy Center | Broward | 583.3 | 2908.0 | 38.9 | -59.4 | 71.0 | 147 | 420 | 1340.1 | NO |
| 1110003 | Fort Pierce Utilities | St. Lucie | 566.8 | 3036.3 | 22.4 | 68.9 | 72.4 | 18 | 156 | 1369.0 | NO |
| 0112120 | North Broward Resource Recovery | Broward | 583.6 | 2907.6 | 39.2 | -59.8 | 71.5 | 147 | 358 | 1350.1 | NO |
| 0112515 | Enron/Pompano Energy Center | Broward | 583.7 | 2905.4 | 39.3 | -62.0 | 73.4 | 148 | 146 | 1388.1 | NO |
| 0990350 | South Florida WMD-Pump Stn. S-9 | Palm Beach | 555.9 | 2882.2 | 11.5 | -85.2 | 86.0 | 172 | 44 | 1639.3 | NO |
| 0610029 | Vero Beach Power | St. Lucie | 567.1 | 3056.5 | 22.7 | 89.1 | 91.9 | 14 | 42 | 1758.9 | NO |
| 0112119 | South Broward Resource Recovery | Broward | 579.6 | 2883.3 | 35.2 | -84.1 | 91.2 | 157 | 383 | 1743.4 | NO |
| 0110037 | FPL -Lauderdale [c] | Broward | 580.1 | 2883.3 | 35.7 | -84.1 | 91.4 | 157 | 1,489 | 1747.3 | YES |
| 0110036 | FPL -Port Everglades [c] | Broward | 587.4 | 2885.3 | 43.0 | -82.1 | 92.7 | 152 | 7,941 | 1773.6 | YES |
| 0550018 | TECO-Phillips Station | Highlands | 464.3 | 3035.4 | -80.1 | 68.0 | 105.1 | 310 | 868 | 2021.4 | NO |
| 0250020 | Tarmac [c] | Dade | 562.9 | 2861.7 | 18.5 | -105.7 | 107.3 | 170 | 1,367 | 2066.1 | YES |
| 0250348 | Dade Co. Resource Recovery [c] | Dade | 564.3 | 2857.4 | 19.9 | -110.0 | 111.8 | 170 | 1,071 | 2155.7 | YES |
| 0550004 | TECO-Sebring/Dinner Lake | Highlands | 456.8 | 3042.5 | -87.6 | 75.1 | 115.4 | 311 | 28 | 2227.7 | NO |
| 0360119 | Lee County Resource Recovery | Lee | 424.2 | 2945.7 | -120.2 | -21.7 | 122.1 | 260 | 108 | 2362.9 | NO |
| 0710002 | FPL - Fort Myers [c] | Lee | 422.1 | 2952.9 | -122.3 | -14.5 | 123.2 | 263 | 4,478 | 2383.1 | YES |

ND = No data available.

[a] Palm Beach Power Coordinates: 544.4 2967.4

[b] Emission inventory is limited to facilities within 54 km of the facility but includes large sources (>1,000 TPY).

[c] Large source beyond screening area included in modeling analysis.

[d] Emissions only for the new rocket engine.

Table 6-13 Summary of $SO_2$ Facilities Included in the PSD Class I Air Modeling Analysis for Simultaneous Operations

| | | | UTM Coordinates | | Relative to Everglades National Park | | | |
|---|---|---|---|---|---|---|---|---|
| AIRS Number | Facility | County | East (km) | North (km) | x (km) | y (km) | Distance [a] (km) | Direction (deg) |
| 0250348 | Dade Co. Resource Recovery | Dade | 564.3 | 2857.4 | 14.3 | 8.8 | 16.8 | 58 |
| 0250020 | Tarmac | Dade | 562.9 | 2861.7 | 12.9 | 13.1 | 18.4 | 45 |
| 0112119 | South Broward Resource Recovery | Broward | 579.6 | 2883.3 | 29.6 | 34.7 | 45.6 | 40 |
| 0110037 | FPL -Lauderdale | Broward | 580.1 | 2883.3 | 30.1 | 34.7 | 45.9 | 41 |
| 0112515 | Enron/Pompano Energy Center | Broward | 583.7 | 2905.5 | 33.7 | 56.9 | 66.1 | 31 |
| 0110120 | North Broward Resource Recovery | Broward | 583.6 | 2907.6 | 33.6 | 59.0 | 67.9 | 30 |
| 0112534 | Enron/Deerfield Beach Energy Center | Broward | 583.1 | 2907.9 | 33.1 | 59.3 | 67.9 | 29 |
| 0112545 | El Paso Broward Energy Center | Broward | 583.3 | 2908.0 | 33.3 | 59.4 | 68.1 | 29 |
| 0710019 | Lee County Resource Recovery | Lee | 424.0 | 2946.0 | -30.0 | 82.8 | 88.1 [b] | 340 |
| 0990332 | New Hope Power Partnership (Okeelanta) | Palm Beach | 524.1 | 2940.0 | -25.9 | 91.4 | 95.0 | 344 |
| 0990005 | Okeelanta | Palm Beach | 525.0 | 2937.4 | -25.0 | 88.8 | 92.3 | 344 |
| 0710000 | FPL - Fort Myers | Lee | 422.1 | 2952.9 | -31.9 | 89.7 | 95.2 [b] | 340 |
| 0990016 | Atlantic Sugar | Palm Beach | 552.9 | 2945.2 | 2.9 | 96.6 | 96.6 | 2 |
| 0990568 | Lake Worth Utilities | Palm Beach | 592.8 | 2943.7 | 42.8 | 95.1 | 104.3 | 24 |
| 0990568 | Lake Worth Generating | Palm Beach | 592.8 | 2943.7 | 42.8 | 95.1 | 104.3 | 24 |
| 0990026 | Sugar Cane Growers Coop. | Palm Beach | 534.9 | 2953.3 | -15.1 | 104.7 | 105.8 | 352 |
| 0990594 | El Paso Belle Glade Generating Station | Palm Beach | 533.5 | 2954.1 | -16.5 | 105.5 | 106.8 | 351 |
| 0510003 | U.S. Sugar Clewiston | Hendry | 506.1 | 2956.9 | -43.9 | 108.3 | 116.9 | 338 |
| 0990234 | Palm Beach Resource Recovery | Palm Beach | 585.8 | 2960.2 | 35.8 | 111.6 | 117.2 | 18 |
| 0990019 | Osceola Farms | Palm Beach | 544.2 | 2968.0 | -5.8 | 119.4 | 119.5 | 357 |
| 0990061 | U.S. Sugar -Bryant | Palm Beach | 537.8 | 2969.1 | -12.2 | 120.5 | 121.1 | 354 |
| 0510015 | Southern Gardens Citrus | Hendry | 487.6 | 2957.6 | -62.4 | 109.0 | 125.6 | 330 |
| 0990021 | Pratt & Whitney | Palm Beach | 559.2 | 2978.3 | 9.2 | 129.7 | 130.0 | 4 |
| 0850102 | Bechtel Indiantown | Martin | 545.6 | 2991.5 | -4.4 | 142.9 | 143.0 | 358 |
| 0850001 | FPL -Martin | Martin | 543.1 | 2992.9 | -6.9 | 144.3 | 144.5 | 357 |

[a] Distance from the northeastern corner of the Everglades National Park, UTM East and North coordinates (km) of 550.0 and 2848.6 , respectively, unless noted.

[b] Distance from the northwestern corner of the Everglades National Park, UTM East and North coordinates (km) of 454.0 and 2863.2 , respectively.

Table 6-14. Summary of $PM_{10}$ Emission Rates Used in the Regional Haze Modeling Analysis
Palm Beach Power Corp.

| Source | Hourly lb/hr | Hourly g/s | Annual TPY | Annual g/s |
|---|---|---|---|---|
| **Current Actual**[a] | | | | |
| Sugar Mill Boiler No. 2 | 43.9 | 5.53 | 50.11 | 4.03 |
| Sugar Mill Boiler No. 3 | 37.4 | 4.71 | 45.37 | 3.65 |
| Sugar Mill Boiler No. 4 | 59.0 | 7.44 | 71.01 | 5.72 |
| Sugar Mill Boiler No. 5a | 23.7 | 2.99 | 26.36 | 2.13 |
| Sugar Mill Boiler No. 5b | 23.7 | 2.99 | 26.36 | 2.13 |
| Sugar Mill Boiler No. 6 | 32.3 | 4.07 | 37.09 | 3.06 |
| **Future Potential**[b] | | | | |
| Cogeneration Boiler No. 1 | 22.8 | 2.87 | 99.87 | 2.873 |
| Cogeneration Boiler No. 2 | 22.8 | 2.87 | 99.87 | 2.873 |
| Package Boiler | 6.46 | 0.814 | 28.31 | 0.814 |

[a] Short-term emissions based on average of last 2 stack tests. Annual emissions based on average actual emissions for 2000 and 2001 (refer to Appendix D for derivation).

[b] Refer to Tables 2-1 through 2-3 and 2-6 for derivation.

Table 6-15. Palm Beach Power Corp. Property Boundary Receptors[a] Used In the Modeling Analysis

| Coordinates[b] | | Coordinates[b] | | Coordinates[b] | | Coordinates[b] | | Coordinates[b] | |
|---|---|---|---|---|---|---|---|---|---|
| X (m) | Y (m) | X (m) | Y (m) | X (m) | Y (m) | X (m) | Y (m) | X (m) | Y (m) |
| -1,219.2 | 2,987.0 | 2,580.8 | 2,987.0 | 1,950.7 | 141.9 | 792.0 | -1,767.8 | -1,219.2 | 21.0 |
| -1,119.2 | 2,987.0 | 2,680.8 | 2,987.0 | 1,950.7 | 41.9 | 692.0 | -1,767.8 | -1,219.2 | 121.0 |
| -1,019.2 | 2,987.0 | 2,743.2 | 2,949.4 | 1,950.7 | -58.1 | 592.0 | -1,767.8 | -1,219.2 | 221.0 |
| -919.2 | 2,987.0 | 2,743.2 | 2,849.4 | 1,950.7 | -158.1 | 492.0 | -1,767.8 | -1,219.2 | 321.0 |
| -819.2 | 2,987.0 | 2,743.2 | 2,749.4 | 2,025.9 | -182.9 | 392.0 | -1,767.8 | -1,219.2 | 421.0 |
| -719.2 | 2,987.0 | 2,743.2 | 2,649.4 | 2,125.9 | -182.9 | 365.8 | -1,694.1 | -1,219.2 | 521.0 |
| -619.2 | 2,987.0 | 2,743.2 | 2,549.4 | 2,225.9 | -182.9 | 365.8 | -1,594.1 | -1,219.2 | 621.0 |
| -519.2 | 2,987.0 | 2,743.2 | 2,449.4 | 2,316.5 | -192.3 | 365.8 | -1,494.1 | -1,219.2 | 721.0 |
| -419.2 | 2,987.0 | 2,743.2 | 2,349.4 | 2,316.5 | -292.3 | 365.8 | -1,394.1 | -1,219.2 | 821.0 |
| -319.2 | 2,987.0 | 2,743.2 | 2,249.4 | 2,316.5 | -392.3 | 365.8 | -1,294.1 | -1,219.2 | 921.0 |
| -219.2 | 2,987.0 | 2,743.2 | 2,149.4 | 2,316.5 | -492.3 | 365.8 | -1,194.1 | -1,219.2 | 1,021.0 |
| -119.2 | 2,987.0 | 2,743.2 | 2,049.4 | 2,316.5 | -592.3 | 365.8 | -1,094.1 | -1,219.2 | 1,121.0 |
| -19.2 | 2,987.0 | 2,743.2 | 1,949.4 | 2,316.5 | -692.3 | 335.7 | -1,024.1 | -1,219.2 | 1,221.0 |
| 80.8 | 2,987.0 | 2,743.2 | 1,849.4 | 2,316.5 | -792.3 | 235.7 | -1,024.1 | -1,219.2 | 1,321.0 |
| 180.8 | 2,987.0 | 2,743.2 | 1,749.4 | 2,316.5 | -892.3 | 135.7 | -1,024.1 | -1,219.2 | 1,421.0 |
| 280.8 | 2,987.0 | 2,743.2 | 1,649.4 | 2,316.5 | -992.3 | 35.7 | -1,024.1 | -1,219.2 | 1,521.0 |
| 380.8 | 2,987.0 | 2,743.2 | 1,549.4 | 2,248.3 | -1,024.1 | -64.3 | -1,024.1 | -1,219.2 | 1,621.0 |
| 480.8 | 2,987.0 | 2,743.2 | 1,449.4 | 2,148.3 | -1,024.1 | -164.3 | -1,024.1 | -1,219.2 | 1,721.0 |
| 580.8 | 2,987.0 | 2,743.2 | 1,349.4 | 2,048.3 | -1,024.1 | -264.3 | -1,024.1 | -1,219.2 | 1,821.0 |
| 680.8 | 2,987.0 | 2,743.2 | 1,249.4 | 1,948.3 | -1,024.1 | -364.3 | -1,024.1 | -1,219.2 | 1,921.0 |
| 780.8 | 2,987.0 | 2,673.4 | 1,219.2 | 1,848.3 | -1,024.1 | -464.3 | -1,024.1 | -1,219.2 | 2,021.0 |
| 880.8 | 2,987.0 | 2,573.4 | 1,219.2 | 1,748.3 | -1,024.1 | -564.3 | -1,024.1 | -1,219.2 | 2,121.0 |
| 980.8 | 2,987.0 | 2,473.4 | 1,219.2 | 1,648.3 | -1,024.1 | -664.3 | -1,024.1 | -1,219.2 | 2,221.0 |
| 1,080.8 | 2,987.0 | 2,373.4 | 1,219.2 | 1,548.3 | -1,024.1 | -764.3 | -1,024.1 | -1,219.2 | 2,321.0 |
| 1,180.8 | 2,987.0 | 2,273.4 | 1,219.2 | 1,448.3 | -1,024.1 | -864.3 | -1,024.1 | -1,219.2 | 2,421.0 |
| 1,280.8 | 2,987.0 | 2,173.4 | 1,219.2 | 1,348.3 | -1,024.1 | -964.3 | -1,024.1 | -1,219.2 | 2,521.0 |
| 1,380.8 | 2,987.0 | 2,073.4 | 1,219.2 | 1,249.7 | -1,025.5 | -1,064.3 | -1,024.1 | -1,219.2 | 2,621.0 |
| 1,480.8 | 2,987.0 | 1,973.4 | 1,219.2 | 1,249.7 | -1,125.5 | -1,164.3 | -1,024.1 | -1,219.2 | 2,721.0 |
| 1,580.8 | 2,987.0 | 1,950.7 | 1,141.9 | 1,249.7 | -1,225.5 | -1,219.2 | -979.0 | -1,219.2 | 2,821.0 |
| 1,680.8 | 2,987.0 | 1,950.7 | 1,041.9 | 1,249.7 | -1,325.5 | -1,219.2 | -879.0 | -1,219.2 | 2,921.0 |
| 1,780.8 | 2,987.0 | 1,950.7 | 941.9 | 1,249.7 | -1,425.5 | -1,219.2 | -779.0 | | |
| 1,880.8 | 2,987.0 | 1,950.7 | 841.9 | 1,249.7 | -1,525.5 | -1,219.2 | -679.0 | | |
| 1,980.8 | 2,987.0 | 1,950.7 | 741.9 | 1,249.7 | -1,625.5 | -1,219.2 | -579.0 | | |
| 2,080.8 | 2,987.0 | 1,950.7 | 641.9 | 1,249.7 | -1,725.5 | -1,219.2 | -479.0 | | |
| 2,180.8 | 2,987.0 | 1,950.7 | 541.9 | 1,192.0 | -1,767.8 | -1,219.2 | -379.0 | | |
| 2,280.8 | 2,987.0 | 1,950.7 | 441.9 | 1,092.0 | -1,767.8 | -1,219.2 | -279.0 | | |
| 2,380.8 | 2,987.0 | 1,950.7 | 341.9 | 992.0 | -1,767.8 | -1,219.2 | -179.0 | | |
| 2,480.8 | 2,987.0 | 1,950.7 | 241.9 | 892.0 | -1,767.8 | -1,219.2 | -79.0 | | |

[a] Receptors were selected at 100-meter spacing along property boundary.

[b] Distances are relative to the midpoint of Cogen Boilers No. 1 and 2.

Note: m = meter

Table 6-16. Everglades National Park Receptors Used in the PSD Class I Modeling Analysis

| UTM Coordinates (m) | | UTM Coordinates (m) | | UTM Coordinates (m) | | UTM Coordinates (m) | |
|---|---|---|---|---|---|---|---|
| East | North | East | North | East | North | East | North |
| 557000 | 2789000 | 538000 | 2848600 | 514500 | 2837000 | 470000 | 2860000 |
| 556600 | 2792000 | 537000 | 2848600 | 514500 | 2836000 | 469000 | 2860000 |
| 556000 | 2796000 | 536000 | 2848600 | 514500 | 2835000 | 468000 | 2860000 |
| 553000 | 2796500 | 535000 | 2848600 | 514500 | 2834000 | 467000 | 2860000 |
| 548000 | 2796500 | 534000 | 2848600 | 514500 | 2833000 | 466000 | 2860000 |
| 542700 | 2796500 | 533000 | 2848600 | 514500 | 2832500 | 465000 | 2860000 |
| 542700 | 2800000 | 532000 | 2848600 | 510000 | 2832500 | 464000 | 2860000 |
| 542700 | 2805000 | 531000 | 2848600 | 509000 | 2832500 | 463000 | 2860000 |
| 542700 | 2810000 | 530000 | 2848600 | 508000 | 2832500 | 462000 | 2860000 |
| 542000 | 2811000 | 529000 | 2848600 | 507000 | 2832500 | 461000 | 2860000 |
| 541300 | 2814000 | 528000 | 2848600 | 506000 | 2832500 | 460000 | 2860000 |
| 542700 | 2816000 | 527000 | 2848600 | 505000 | 2832500 | 459500 | 2863200 |
| 544100 | 2820000 | 526000 | 2848600 | 504000 | 2832500 | 459000 | 2863200 |
| 543500 | 2824600 | 525000 | 2848600 | 503000 | 2832500 | 458000 | 2863200 |
| 545000 | 2829000 | 524000 | 2848600 | 502000 | 2832500 | 457000 | 2863200 |
| 545700 | 2832200 | 523000 | 2848600 | 501000 | 2832500 | 456000 | 2863200 |
| 546200 | 2835700 | 522000 | 2848600 | 500000 | 2832500 | 455000 | 2863200 |
| 548600 | 2837500 | 521000 | 2848600 | 499000 | 2832500 | 454000 | 2863200 |
| 550300 | 2839000 | 520000 | 2848600 | 498000 | 2832500 | | |
| 545000 | 2839000 | 519000 | 2848600 | 497000 | 2832500 | | |
| 540000 | 2839000 | 518000 | 2848600 | 496000 | 2832500 | | |
| 550500 | 2844000 | 517000 | 2848600 | 495000 | 2832500 | | |
| 545000 | 2844000 | 516000 | 2848600 | 495000 | 2833000 | | |
| 540000 | 2844000 | 515000 | 2848600 | 495000 | 2834000 | | |
| 550300 | 2848600 | 514500 | 2848600 | 495000 | 2835000 | | |
| 549000 | 2848600 | 514500 | 2848000 | 495000 | 2836000 | | |
| 548000 | 2848600 | 514500 | 2847600 | 494500 | 2837000 | | |
| 547000 | 2848600 | 514500 | 2846600 | 491500 | 2841000 | | |
| 546000 | 2848600 | 514500 | 2845000 | 488500 | 2845500 | | |
| 545000 | 2848600 | 514500 | 2844000 | 483000 | 2848500 | | |
| 544000 | 2848600 | 514500 | 2843000 | 480000 | 2852500 | | |
| 543000 | 2848600 | 514500 | 2842000 | 475000 | 2854000 | | |
| 542000 | 2848600 | 514500 | 2841000 | 473500 | 2857000 | | |
| 541000 | 2848600 | 514500 | 2840000 | 473000 | 2860000 | | |
| 540000 | 2848600 | 514500 | 2839000 | 472000 | 2860000 | | |
| 539000 | 2848600 | 514500 | 2838000 | 471000 | 2860000 | | |

Note: Palm Beach Power's coordinates are 544400 m E, 2967400 m N.
m = meter

Table 6-17. Palm Beach Power Corp. and Osceola Farms Building Dimensions Used in the Modeling Analysis

| Structure | Height | | Length | | Width | |
|---|---|---|---|---|---|---|
| | ft | m | ft | m | ft | m |
| PBPC Cogen Boilers Building | 120 | 36.6 | 138 | 42.0 | 75 | 23.0 |
| Osceola Farms Boiling House/Mill | 70 | 21.3 | 302 | 92.0 | 230 | 70.0 |

**Figure 6-1. Palm Beach Power Corp. Property Boundary and Off-Property Receptors Used in the Modeling Analysis**

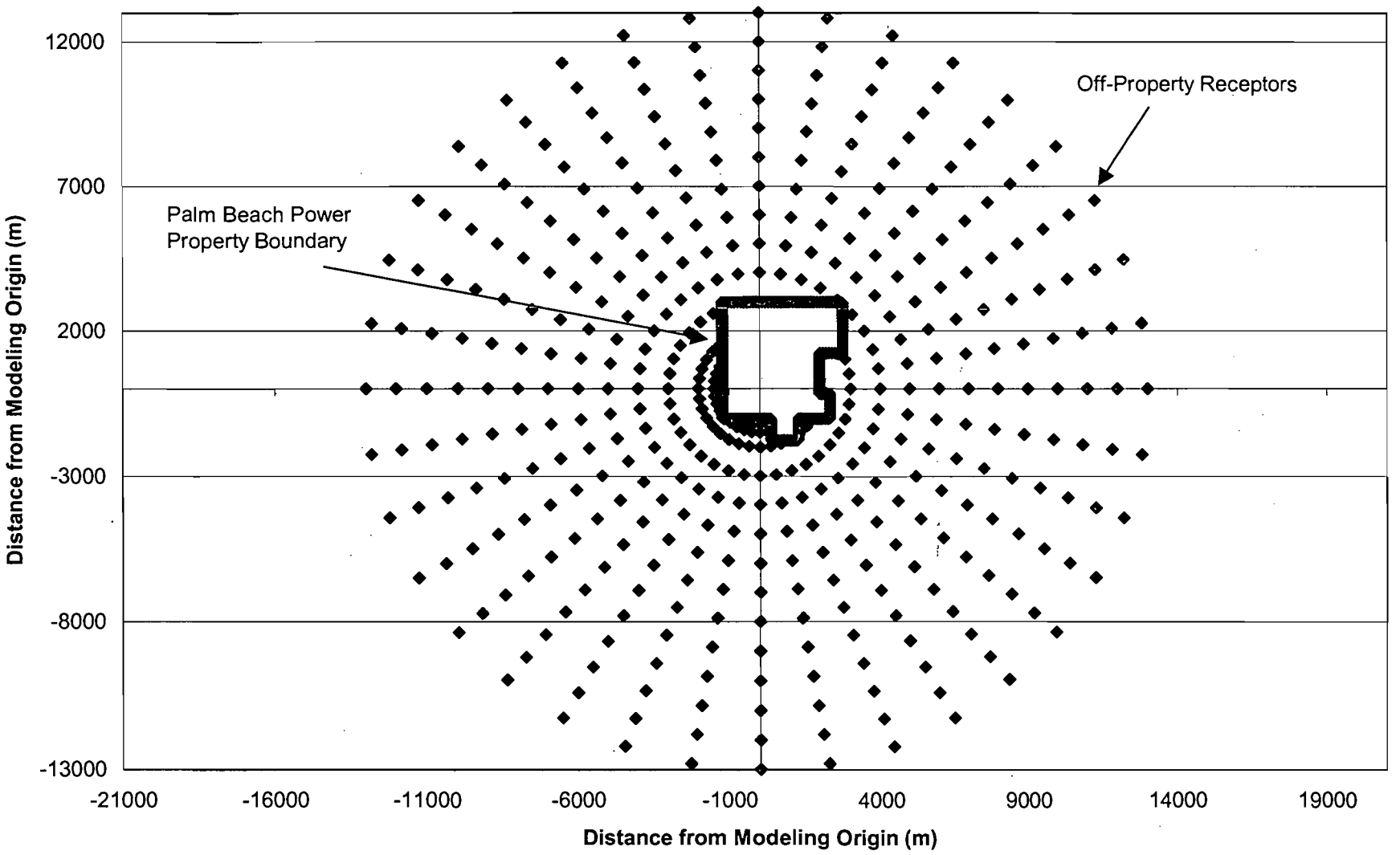
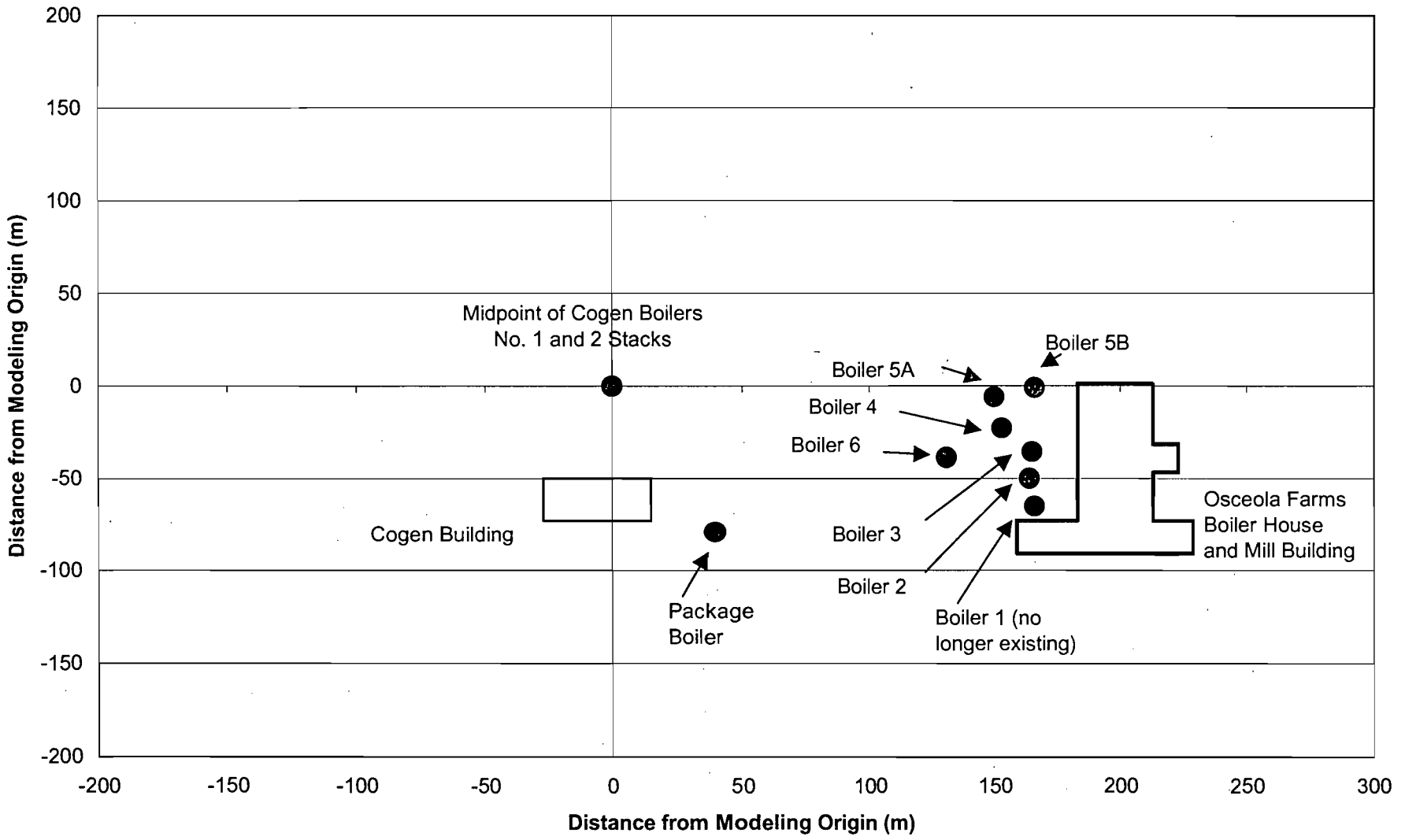


**Figure 6-2. Palm Beach Power Corp. and Osceola Farms Building and Stack Locations**



# 7.0 AIR QUALITY IMPACT ANALYSIS RESULTS

## 7.1 PROPOSED PBPC PROJECT

Presented in this section are results of the air quality impact analysis for the proposed PBPC project, i.e., the PBPC cogeneration boilers and package boiler operating and the Osceola Farms sugar mill boilers shutdown. Results of the analysis for simultaneous operations of the PBPC boilers and Osceola Farms boilers are presented in Section 7.2.

### 7.1.1 CLASS II AREA SIGNIFICANT IMPACT ANALYSIS

A summary of the predicted maximum $SO_2$ and $NO_2$ concentrations due to the proposed project-only for the significant impact analysis is presented in Table 7-1. Annual $SO_2$ and $NO_2$ impacts shown in Table 7-1 represent the entire year, while the 24- and 3-hour $SO_2$ impacts are divided into crop and off-crop seasons. The modeling results demonstrate that maximum predicted concentrations due to the proposed project only are above the significant impact levels for $SO_2$. It was further determined that the significant impact area for the proposed project's $SO_2$ emissions extends out approximately 4 km from PBPC for the crop season and 13 km from PBPC for the off-crop season. As a result, additional modeling analyses were performed for $SO_2$ to address compliance with AAQS and PSD increments.

### 7.1.2 AAQS ANALYSIS

The maximum annual, HSH 24-hour, and HSH 3-hour average $SO_2$ concentrations predicted for all sources for the crop and off-crop seasons from the screening analysis is presented in Table 7-2. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are presented in Table 7-3. The annual impacts represent the sum of the maximum annual impacts from the crop and off-crop seasons. The maximum predicted annual $SO_2$ concentration is 43.2 $\mu g/m^3$. The maximum predicted HSH 24-hour and 3-hour concentrations for the crop season are 166.4 and 490.2 $\mu g/m^3$, respectively. The maximum predicted HSH 24-hour and 3-hour concentrations for the off-crop season are 56.3 and 207.1 $\mu g/m^3$, respectively. These concentrations include ambient non-modeled annual, 24-hour, and 3-hour concentrations of 5, 13, and 47 $\mu g/m^3$, respectively. The maximum predicted annual, HSH 24-hour, and HSH 3-hour average $SO_2$ concentrations are below the Florida AAQS of 60, 260, and 1,300 $\mu /m^3$, respectively.

### 7.1.3 PSD CLASS II ANALYSIS

A summary of the maximum $SO_2$ PSD Class II increment consumption predicted for all sources for the screening analysis is presented in Table 7-4. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are presented in Table 7-5. The annual impacts shown in the table represent the sum of the maximum predicted impacts from the crop and off-crop seasons. The maximum predicted annual $SO_2$ increment consumption concentration is 9.3 $\mu g/m^3$. The maximum predicted HSH 24-hour and 3-hour $SO_2$ increment consumption concentrations from the crop season are 70.6 and 219.3 $\mu g/m^3$, respectively. The maximum predicted HSH 24-hour and 3-hour $SO_2$ increment consumption concentrations from the off-crop season are 13.5 and 65.6 $\mu g/m^3$, respectively. The maximum predicted annual and HSH 24-hour and 3-hour $SO_2$ increment consumption concentrations are less than the allowable PSD Class II increments of 20, 91, and 512 $\mu g/m^3$, respectively.

### 7.1.4 PSD CLASS I ANALYSIS

The maximum $SO_2$ and $NO_2$ concentrations predicted for the proposed project only at the ENP PSD Class I area are compared with the EPA's proposed PSD Class I significance levels and the PSD Class I increments in Table 7-6. The maximum predicted impacts are below the significant impact levels for $SO_2$ and $NO_2$ for all averaging times. Therefore, a full PSD Class I incremental analysis was not performed for $SO_2$ or $NO_2$.

### 7.1.5 FLUORIDE IMPACTS

There are no AAQS or PSD increments for fluorides. However, fluoride impacts are required for the additional impact analysis. The maximum increase in ambient fluoride concentrations due to the proposed project in the site vicinity are presented in Table 7-7, for the annual, 24-, 8-, 3-, and 1-hour averaging times. In the site vicinity, the maximum predicted annual, 24-, 8-, 3-, and 1-hour fluoride concentrations are 0.0020, 0.062, 0.12, 0.18, and 0.29 $\mu g/m^3$, respectively.

Fluoride impacts are also required for the AQRV analysis for the PSD Class I area. This analysis and fluoride impacts at the ENP are presented in Section 8.0.

### 7.1.6 SAM IMPACTS

There are no AAQS or PSD increments for SAM. However, SAM impacts are required for the additional impact analysis. The maximum increase in SAM concentrations due to the proposed

project in the site vicinity are presented in Table 7-8, for the annual, 24-, 8-, 3-, and 1-hour averaging times. In the site vicinity, the maximum predicted annual, 24-, 8-, 3-, and 1-hour SAM concentrations are 0.0070, 1.67, 3.16, 4.73, and 7.68 $\mu g/m^3$, respectively.

SAM impacts are also required for the AQRV analysis for the PSD Class I area. This analysis and SAM impacts at the ENP are presented in Section 8.0.

### 7.1.7 LEAD IMPACTS

Although there are no PSD increments for Pb, there is an AAQS for Pb. Also, Pb impacts are required for the additional impact analysis. The maximum increase in ambient Pb concentrations due to the proposed project in the site vicinity are presented in Table 7-9, for the annual, 24-, 8-, 3-, and 1-hour averaging times. In the site vicinity, the maximum predicted annual, 24-, 8-, 3-, and 1-hour Pb concentrations are 0.0008, 0.013, 0.025, 0.037, and 0.061 $\mu g/m^3$, respectively. All of these concentrations are well below the AAQS for Pb of 1.5 $\mu g/m^3$, calendar quarter arithmetic average.

Pb impacts are also required for the AQRV analysis for the PSD Class I area. This analysis and Pb impacts at the ENP are presented in Section 8.0.

## 7.2 SIMULTANEOUS OPERATIONS

Presented in this section are results of the air quality impact analysis for simultaneous operations of the PBPC boilers and Osceola Farms boilers. As described in Section 6.0, simultaneous operations will only occur for up to 2,880 hours over the first year of operations, and only during the sugar cane processing season. Therefore, this situation was modeled only during the sugar cane crop season with the PBPC boilers operating along with the Osceola Farms sugar mill boilers. The significant impact area of 4 km predicted for the project for the crop season was used in the simultaneous operations modeling analysis.

### 7.2.1 AAQS ANALYSIS

A summary of the maximum predicted annual and hourly $SO_2$, $PM_{10}$, $NO_2$ and CO impacts for the simultaneous operation modeling analysis, due to all sources from the screening analysis, is presented in Table 7-10. Based on the screening analysis, further refinements were performed. The results of the refined analysis are presented in Table 7-11. The annual impacts shown in the table represent the sum of the maximum predicted impacts from the crop and off-crop seasons. The

maximum predicted annual $SO_2$ concentration from the refined analysis for the crop season is 44.8 µg/m$^3$. The HSH 24-hour and 3-hour $SO_2$ concentrations from the refined analysis for the crop season are 166.4 and 514.9 µg/m$^3$, respectively. These concentrations include ambient non-modeled annual, 24-hour, and 3-hour concentrations of 5, 13, and 47 µg/m$^3$, respectively. The maximum predicted annual, HSH 24-hour, and HSH 3-hour average $SO_2$ concentrations are below the Florida AAQS of 60, 260, and 1,300 µg/m$^3$, respectively.

The maximum predicted annual $PM_{10}$ concentration from the refined analysis for the crop season is 37.9 µg/m$^3$. The H6H 24-hour $PM_{10}$ concentration from the refined analysis for the crop season is 104.1 µg/m$^3$, respectively. These concentrations include ambient non-modeled annual and 24-hour concentrations of 19 and 36 µg/m$^3$, respectively. The maximum predicted annual and HSH 24-hour average $PM_{10}$ concentrations are below the Florida AAQS of 50 and 150 µg/m$^3$, respectively.

The maximum predicted annual $NO_2$ concentration is 68.6 µg/m$^3$. This concentration includes an ambient non-modeled annual background concentration of 30 µg/m$^3$. The maximum predicted annual average $NO_2$ concentration is below the Florida AAQS of 100 µg/m$^3$.

The maximum predicted HSH 8-hour and 1-hour CO concentrations for the crop season are 9,936 µg/m$^3$ and 29,023 µg/m$^3$, respectively. These concentrations include ambient non-modeled 8-hour and 1-hour background concentrations of 3,220 and 4,600 µg/m$^3$, respectively. These are very conservative background CO concentrations and therefore actual CO concentrations are expected to be much less than predicted. Nonetheless, the maximum predicted HSH 8-hour and 1-hour average CO concentrations are below the Florida AAQS of 10,000 and 40,000 µg/m$^3$, respectively.

### 7.2.2 PSD CLASS II ANALYSIS

The maximum $SO_2$, $PM_{10}$, and $NO_2$ PSD Class II increment consumption predicted for all sources due to simultaneous operations, for the screening analysis, is presented in Table 7-12. Based on the screening analysis results, modeling refinements were performed. The results of the refined modeling analysis are presented in Table 7-13. The annual impacts shown in the tables represent the sum of the maximum predicted impacts from the crop and off-crop seasons.

The maximum predicted annual $SO_2$ increment consumption concentration is 10.9 µg/m$^3$. The HSH 24-hour and 3-hour $SO_2$ increment consumption concentrations predicted for the simultaneous

operation (crop season only) are 70.6 and 219.3 $\mu g/m^3$, respectively. These maximum concentrations are less than the allowable PSD Class II increments of 20, 91, and 512 $\mu g/m^3$, respectively.

The maximum predicted annual $PM_{10}$ increment consumption concentration is 3.7 $\mu g/m^3$. The HSH 24-hour $PM_{10}$ increment consumption concentration predicted for simultaneous operation (crop season only) is 28.2 $\mu g/m^3$. These maximum concentrations are less than the allowable PSD Class II increments of 17 and 30 $\mu g/m^3$, respectively.

The maximum predicted annual $NO_2$ increment consumption concentration of 23.3 $\mu g/m^3$ is less than the allowable PSD Class II increment of 25 $\mu g/m^3$.

### 7.2.3 PSD CLASS I ANALYSIS

The maximum $SO_2$, $PM_{10}$, and $NO_2$ concentrations predicted for simultaneous operations at the ENP PSD Class I area, for the significant impact analysis, are compared with the EPA's proposed PSD Class I significance levels and the PSD Class I increments in Table 7-14. Maximum predicted impacts were above the significant impact levels for $SO_2$ for the 24-hour and 3-hour averaging times only. Therefore, a full PSD Class I incremental analysis was performed for $SO_2$.

The maximum $SO_2$ PSD Class I increment consumption predicted for all sources due to simultaneous operation, for the refined analysis, is presented in Table 7-15. The maximum predicted HSH 24-hour and 3-hour $SO_2$ increment consumption concentrations are 3.8 and 19.2 $\mu g/m^3$, respectively. These maximum concentrations are less than the allowable PSD Class I increments of 5 and 25 $\mu g/m^3$, respectively.

### 7.2.4 FLUORIDE IMPACTS

Fluoride impacts are required for the additional impact analysis. The maximum increase in fluoride concentrations due to simultaneous operation in the site vicinity are presented in Table 7-16, for the annual, 24-, 8-, 3-, and 1-hour averaging times. In the site vicinity, the maximum predicted annual, 24-, 8-, 3-, and 1-hour fluoride concentrations are 0.005, 0.062, 0.12, 0.18, and 0.29 $\mu g/m^3$, respectively.

Fluoride impacts are also required for the AQRV analysis for the PSD Class I area. This analysis and fluoride impacts at the ENP are presented in Section 8.0.

### 7.2.5 SAM IMPACTS

There are no AAQS or PSD increments for SAM. However, SAM impacts are required for the additional impact analysis. The maximum increase in SAM concentrations due to simultaneous operations in the site vicinity are presented in Table 7-17, for the annual, 24-, 8-, 3-, and 1-hour averaging times. In the site vicinity, the maximum predicted annual, 24-, 8-, 3-, and 1-hour SAM concentrations are 0.0048, 1.67, 3.16, 4.82, and 7.75 $\mu g/m^3$, respectively.

SAM impacts are also required for the AQRV analysis for the PSD Class I area. This analysis and SAM impacts at the ENP are presented in Section 8.0.

### 7.2.6 LEAD IMPACTS

There are PSD increments for Pb, but an AAQS for Pb does exist. Also, Pb impacts are required for the additional impact analysis. The maximum increase in Pb concentrations due to simultaneous operations in the site vicinity are presented in Table 7-18, for the annual, 24-, 8-, 3-, and 1-hour averaging times. In the site vicinity, the maximum predicted annual, 24-, 8-, 3-, and 1-hour Pb concentrations are 0.001, 0.013, 0.025, 0.038, and 0.061 $\mu g/m^3$, respectively. These concentrations are all well below the AAQS for Pb of 1.5 $\mu g/m^3$, calendar quarter average.

Pb impacts are also required for the AQRV analysis for the PSD Class I area. This analysis and Pb impacts at the ENP are presented in Section 7.0.

Table 7-1. Maximum Predicted Impacts Due to the Proposed Project Only
Palm Beach Power Corp.

| Pollutant/ Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] Direction (degrees) | Receptor Location [b] Distance (m) | Time Period (YYMMDDHH) | EPA Significant Impact Level ($\mu g/m^3$) |
|---|---|---|---|---|---|
| **$SO_2$** | | | | | |
| Annual | 0.145 | 300.0 | 5,000 | 87123124 | |
| | 0.079 | 310.0 | 7,000 | 88123124 | |
| | 0.051 | 300.0 | 10,000 | 89123124 | 1 |
| | 0.061 | 300.0 | 10,000 | 90123124 | |
| | 0.096 | 300.0 | 7,000 | 91123124 | |
| **Crop Season Only** | | | | | |
| Highest 24-Hour | 9.3 | 161.9 | 1,078 | 87021224 | |
| | 9.2 | 161.9 | 1,078 | 88123124 | |
| | 9.2 | 161.9 | 1,078 | 89120624 | 5 |
| | 8.2 | 161.5 | 1,154 | 90121924 | |
| | 8.7 | 161.9 | 1,078 | 91012324 | |
| Highest 3-Hour | 52.7 | 161.9 | 1,078 | 87022403 | |
| | 54.8 | 165.3 | 1,441 | 88120421 | |
| | 70.1 | 161.9 | 1,078 | 89101303 | 25 |
| | 80.5 | 163.0 | 1,249 | 90112603 | |
| | 66.2 | 161.5 | 1,154 | 91012306 | |
| **Off-Crop Season Only** | | | | | |
| Highest 24-Hour | 18.7 | 216.7 | 1,278 | 87053024 | |
| | 13.8 | 297.0 | 1,368 | 88071124 | |
| | 16.5 | 328.9 | 2,360 | 89060924 | 5 |
| | 15.0 | 220.2 | 1,340 | 90041324 | |
| | 14.4 | 290.0 | 2,000 | 91052124 | |
| Highest 3-Hour | 78.2 | 150.7 | 2,027 | 87081906 | |
| | 85.9 | 161.9 | 1,078 | 88040603 | |
| | 69.3 | 289.1 | 1,290 | 89042415 | 25 |
| | 70.5 | 271.0 | 1,219 | 90070712 | |
| | 73.0 | 289.1 | 1,290 | 91082912 | |
| **$NO_2$** | | | | | |
| Annual | 0.50 | 300.0 | 4,000 | 87123124 | |
| | 0.29 | 310.0 | 5,000 | 88123124 | |
| | 0.26 | 300.0 | 7,000 | 89123124 | 1 |
| | 0.30 | 300.0 | 7,000 | 90123124 | |
| | 0.40 | 300.0 | 5,000 | 91123124 | |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

Note: YYMMDDHH = Year, Month, Day, Hour Ending

Table 7-2. Maximum Predicted $SO_2$ Impacts For All Sources, AAQS Screening Analysis, Palm Beach Power Corp.

| Pollutant/ Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] Direction (degrees) | Distance (m) | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| Annual [c] | 37.9 | 250.0 | 4,000 | 87123124 |
| | 36.6 | 250.0 | 4,000 | 88123124 |
| | 37.4 | 240.0 | 4,000 | 89123124 |
| | 30.0 | 250.0 | 4,000 | 90123124 |
| | 30.2 | 250.0 | 4,000 | 91123124 |
| **Crop Season Only** | | | | |
| HSH 24-Hour | 122.3 | 280.0 | 4,000 | 87011124 |
| | 148.0 | 260.0 | 4,000 | 88031524 |
| | 133.1 | 260.0 | 4,000 | 89120424 |
| | 108.1 | 250.0 | 4,000 | 90102624 |
| | 119.7 | 250.0 | 4,000 | 91031024 |
| HSH 3-Hour | 431.6 | 290.0 | 4,000 | 87012621 |
| | 409.4 | 310.0 | 4,000 | 88042618 |
| | 387.9 | 260.0 | 3,000 | 89121124 |
| | 367.8 | 190.0 | 2,000 | 90011003 |
| | 375.0 | 300.0 | 4,000 | 91042121 |
| **Off-Crop Season Only** | | | | |
| HSH 24-Hour | 34.2 | 40.0 | 12,000 | 87091224 |
| | 42.1 | 300.0 | 3,000 | 88071924 |
| | 34.2 | 332.3 | 2,622 | 89060324 |
| | 33.9 | 110.0 | 6,000 | 90082124 |
| | 33.0 | 280.0 | 2,000 | 91072124 |
| HSH 3-Hour | 136.9 | 334.2 | 2,800 | 87061524 |
| | 160.1 | 130.0 | 13,000 | 88081021 |
| | 132.7 | 170.0 | 12,000 | 89091524 |
| | 125.8 | 335.9 | 2,982 | 90082124 |
| | 140.4 | 337.3 | 3,165 | 91073124 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

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

Table 7-3. Maximum Predicted $SO_2$ Concentrations for All Sources Compared to the AAQS - Refined Analysis
Palm Beach Power Corp.

| Pollutant/ Averaging Time | Concentration ($\mu g/m^3$) [a] Total | Modeled Sources | Background | Receptor Location [b] Direction (degree) | Distance (m) | Time Period (YYMMDDHH) | Florida AAQS ($\mu g/m^3$) |
|---|---|---|---|---|---|---|---|
| Annual [c] | 43.2 | 38.2 | 5 | 252 | 4,000 | 87123124 | |
| | 41.7 | 36.7 | 5 | 249 | 4,000 | 88123124 | 60 |
| | 42.8 | 37.8 | 5 | 246 | 4,000 | 89123124 | |
| **Crop Season Only** | | | | | | | |
| HSH 24-Hour | 166.4 | 153.4 | 13 | 263 | 4,000 | 88121724 | 260 |
| HSH 3-Hour | 487.9 | 440.9 | 47 | 291 | 3,900 | 87012621 | 1,300 |
| | 490.2 | 443.2 | 47 | 286 | 4,000 | 88031024 | |
| **Off-Crop Season Only** | | | | | | | |
| HSH 24-Hour | 56.3 | 43.3 | 13 | 309 | 2,600 | 88071924 | 260 |
| HSH 3-Hour | 207.1 | 160.1 | 47 | 130 | 13,000 | 88081021 | 1,300 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

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

Table 7-4. Maximum Predicted $SO_2$ Impacts For All Sources, PSD Class II Screening Analysis, Palm Beach Power Corp.

| Pollutant/ Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] Direction (degree) | Receptor Location [b] Distance (m) | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| Annual [c] | 9.2 | 250 | 4,000 | 87123124 |
| | 7.9 | 250 | 4,000 | 88123124 |
| | 7.6 | 240 | 4,000 | 89123124 |
| | 4.7 | 210 | 4,000 | 90123124 |
| | 4.6 | 250 | 4,000 | 91123124 |
| **Crop Season Only** | | | | |
| HSH 24-Hour | 57.8 | 280 | 4,000 | 87011124 |
| | 68.3 | 260 | 4,000 | 88121724 |
| | 61.1 | 260 | 4,000 | 89120424 |
| | 49.6 | 250 | 4,000 | 90102624 |
| | 52.8 | 250 | 4,000 | 91031024 |
| HSH 3-Hour | 197.5 | 290 | 4,000 | 87121603 |
| | 185.1 | 260 | 4,000 | 88102209 |
| | 179.0 | 260 | 3,000 | 89121124 |
| | 173.0 | 280 | 4,000 | 90102309 |
| | 172.3 | 270 | 4,000 | 91020815 |
| **Off-Crop Season Only** | | | | |
| HSH 24-Hour | 13.5 | 220 | 1,340 | 87052824 |
| | 13.0 | 276 | 1,225 | 88081124 |
| | 11.9 | 297 | 1,368 | 89073124 |
| | 12.1 | 297 | 1,368 | 90060724 |
| | 12.5 | 301 | 1,416 | 91072824 |
| HSH 3-Hour | 59.2 | 217 | 1,278 | 87053012 |
| | 61.4 | 178 | 1,025 | 88092821 |
| | 63.2 | 162 | 1,154 | 89090606 |
| | 63.1 | 270 | 1,500 | 90092115 |
| | 65.6 | 307 | 1,528 | 91070615 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

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

Table 7-5. Maximum Predicted $SO_2$ Concentrations for All Sources Compared to the PSD Class II Increment Refined Analysis, Palm Beach Power Corp.

| Pollutant/ Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] Direction (degree) | Receptor Location [b] Distance (m) | Time Period (YYMMDDHH) | PSD Increment ($\mu g/m^3$) |
|---|---|---|---|---|---|
| Annual [c] | 9.3 | 253 | 4,000 | 87123124 | |
| | 7.9 | 250 | 4,000 | 88123124 | |
| | 7.6 | 240 | 4,000 | 89123124 | 20 |
| | 4.7 | 210 | 4,000 | 90123124 | |
| | 4.6 | 250 | 4,000 | 91123124 | |
| **Crop Season Only** | | | | | |
| HSH 24-Hour | 70.6 | 263 | 4,000 | 88121724 | 91 |
| HSH 3-Hour | 219.3 | 265 | 4,000 | 87042109 | |
| | 207.9 | 284 | 4,000 | 88110409 | 512 |
| | 207.0 | 287 | 4,000 | 89010406 | |
| **Off-Crop Season Only** | | | | | |
| HSH 24-Hour | 13.5 | 220 | 1,340 | 87052824 | |
| | 13.0 | 276 | 1,225 | 88081124 | 91 |
| | 12.1 | 297 | 1,368 | 90060724 | |
| | 12.5 | 301 | 1,416 | 91072824 | |
| HSH 3-Hour | 59.2 | 217 | 1,278 | 87053012 | |
| | 61.4 | 178 | 1,025 | 88092821 | |
| | 63.2 | 162 | 1,154 | 89090606 | 512 |
| | 63.1 | 270 | 1,500 | 90092115 | |
| | 65.6 | 307 | 1,528 | 91070615 | |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

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

Table 7-6. Summary of Maximum Pollutant Concentrations Predicted for the Project Only Compared to the EPA Class I Significant Impact Levels and PSD Class I Increments

| Pollutant | Averaging Time | Maximum Concentration[a] ($\mu g/m^3$) | EPA Class I Significant Impact Levels ($\mu g/m^3$) | PSD Class I Increments ($\mu g/m^3$) |
|---|---|---|---|---|
| $SO_2$ | Annual | 0.00060 | 0.1 | 2 |
| | 24-Hour | 0.18 | 0.2 | 5 |
| | 3-Hour | 0.98 | 1.0 | 25 |
| $NO_2$ | Annual | 0.0013 | 0.1 | 2.5 |

[a] Highest concentration predicted with CALPUFF model and CALMET South Florida Domain, 1990.

Table 7-7. Maximum Predicted Increase in Fluoride Impacts Due to the Proposed Project at the Site Vicinity

| Averaging Period | Concentration[a] ($\mu g/m^3$) | Receptor Location[b] | | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| | | Direction (degree) | Distance (m) | |
| Annual | 0.0020 | 300 | 5,000 | 87123124 |
| | 0.0010 | 310 | 5,000 | 88123124 |
| | 0.0010 | 300 | 6,000 | 89123124 |
| | 0.0020 | 300 | 6,000 | 90123124 |
| | 0.0020 | 300 | 5,000 | 91123124 |
| High 24-Hour | 0.062 | 217 | 1,278 | 87053024 |
| | 0.041 | 260 | 1,500 | 88061824 |
| | 0.050 | 329 | 2,360 | 89060924 |
| | 0.049 | 220 | 1,340 | 90041324 |
| | 0.045 | 290 | 3,000 | 91052124 |
| High 8-Hour | 0.12 | 217 | 1,278 | 87053016 |
| | 0.10 | 262 | 1,232 | 88061816 |
| | 0.09 | 266 | 1,222 | 89051916 |
| | 0.09 | 280 | 1,239 | 90081616 |
| | 0.10 | 307 | 1,528 | 91072416 |
| High 3-Hour | 0.18 | 200 | 1,087 | 87082312 |
| | 0.17 | 153 | 1,980 | 88052709 |
| | 0.15 | 289 | 1,290 | 89042415 |
| | 0.16 | 271 | 1,219 | 90070712 |
| | 0.16 | 289 | 1,290 | 91082912 |
| High 1-Hour | 0.29 | 310 | 2,000 | 87051007 |
| | 0.23 | 15 | 3,087 | 88081010 |
| | 0.27 | 280 | 1,239 | 89073011 |
| | 0.29 | 146 | 2,132 | 90071712 |
| | 0.23 | 95 | 2,134 | 91041908 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 7-8. Maximum Predicted Increase in Sulfuric Acid Mist Impacts Due to the Proposed Project at the Site Vicinity

| Averaging Period | Concentration[a] ($\mu g/m^3$) | Receptor Location[b] | | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| | | Direction (degree) | Distance (m) | |
| Annual | 0.0070 | 300 | 6,000 | 87123124 |
| | 0.0040 | 310 | 9,000 | 88123124 |
| | 0.0020 | 300 | 15,000 | 89123124 |
| | 0.0030 | 300 | 10,000 | 90123124 |
| | 0.0040 | 300 | 9,000 | 91123124 |
| High 24-Hour | 1.67 | 217 | 1,278 | 87053024 |
| | 1.16 | 260 | 1,500 | 88061824 |
| | 1.41 | 329 | 2,360 | 89060924 |
| | 1.33 | 220 | 1,340 | 90041324 |
| | 1.24 | 290 | 3,000 | 91052124 |
| High 8-Hour | 3.16 | 217 | 1,278 | 87053016 |
| | 2.83 | 262 | 1,232 | 88061816 |
| | 2.47 | 253 | 1,277 | 89072516 |
| | 2.31 | 280 | 1,239 | 90081616 |
| | 2.73 | 307 | 1,528 | 91072416 |
| High 3-Hour | 4.73 | 200 | 1,087 | 87082312 |
| | 4.62 | 162 | 1,078 | 88040603 |
| | 4.19 | 289 | 1,290 | 89042415 |
| | 4.37 | 163 | 1,249 | 90112603 |
| | 4.43 | 289 | 1,290 | 91082912 |
| High 1-Hour | 7.68 | 310 | 2,000 | 87051007 |
| | 7.62 | 162 | 1,078 | 88072802 |
| | 7.51 | 162 | 1,078 | 89073106 |
| | 7.75 | 146 | 2,132 | 90071712 |
| | 7.64 | 162 | 1,078 | 91082802 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 7-9. Maximum Predicted Increase in Lead Impacts Due to the Proposed Project at the Site Vicinity

| Averaging Period | Concentration[a] ($\mu g/m^3$) | Receptor Location[b] Direction (degree) | Receptor Location[b] Distance (m) | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| Annual | 0.0007 | 300 | 3,000 | 87123124 |
| | 0.0006 | 270 | 3,000 | 88123124 |
| | 0.0007 | 300 | 3,000 | 89123124 |
| | 0.0008 | 300 | 3,000 | 90123124 |
| | 0.0008 | 300 | 3,000 | 91123124 |
| High 24-Hour | 0.013 | 217 | 1,278 | 87053024 |
| | 0.009 | 260 | 1,500 | 88061824 |
| | 0.011 | 329 | 2,360 | 89060924 |
| | 0.010 | 220 | 1,340 | 90041324 |
| | 0.010 | 290 | 3,000 | 91052124 |
| High 8-Hour | 0.025 | 217 | 1,278 | 87053016 |
| | 0.022 | 262 | 1,232 | 88061816 |
| | 0.019 | 266 | 1,222 | 89051916 |
| | 0.018 | 280 | 1,239 | 90081616 |
| | 0.021 | 307 | 1,528 | 91072416 |
| High 3-Hour | 0.037 | 200 | 1,087 | 87082312 |
| | 0.036 | 153 | 1,980 | 88052709 |
| | 0.033 | 289 | 1,290 | 89042415 |
| | 0.033 | 271 | 1,219 | 90070712 |
| | 0.035 | 289 | 1,290 | 91082912 |
| High 1-Hour | 0.060 | 310 | 2,000 | 87051007 |
| | 0.049 | 153 | 1,980 | 88052707 |
| | 0.057 | 280 | 1,239 | 89073011 |
| | 0.061 | 146 | 2,132 | 90071712 |
| | 0.049 | 95 | 2,134 | 91041908 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 7-10. Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation AAQS Screening Analyses, Crop Season Only

| Pollutant/ Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] Direction (degrees) | Distance (m) | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| **$SO_2$** | | | | |
| Annual [c] | 39.4 | 250.0 | 4,000 | 87123124 |
| | 38.5 | 250.0 | 4,000 | 88123124 |
| | 38.9 | 250.0 | 4,000 | 89123124 |
| | 37.6 | 266.3 | 1,222 | 90123124 |
| | 32.3 | 250.0 | 4,000 | 91123124 |
| HSH 24-Hour | 122.3 | 280.0 | 4,000 | 87011124 |
| | 148.0 | 260.0 | 4,000 | 88031524 |
| | 133.1 | 260.0 | 4,000 | 89120424 |
| | 109.5 | 230.0 | 4,000 | 90121124 |
| | 119.7 | 250.0 | 4,000 | 91031024 |
| HSH 3-Hour | 439.5 | 80.0 | 2,000 | 87040306 |
| | 409.4 | 102.0 | 2,368 | 88031024 |
| | 435.0 | 77.2 | 2,000 | 89042103 |
| | 419.6 | 275.7 | 1,225 | 90010409 |
| | 467.9 | 74.5 | 2,025 | 91032406 |
| **$PM_{10}$** | | | | |
| Annual [c] | 13.3 | 134.4 | 1,750 | 87123124 |
| | 14.8 | 271.0 | 1,219 | 88123124 |
| | 12.7 | 275.7 | 1,225 | 89123124 |
| | 18.9 | 266.3 | 1,222 | 90123124 |
| | 13.0 | 261.6 | 1,232 | 91123124 |
| H6H 24-Hour | 68.1 | 257.1 | 1,251 | 91111524 |
| **$NO_2$** | | | | |
| Annual [c] | 29.4 | 134.4 | 1,750 | 87123124 |
| | 32.7 | 271.0 | 1,219 | 88123124 |
| | 30.1 | 275.7 | 1,225 | 89123124 |
| | 38.6 | 266.3 | 1,222 | 90123124 |
| | 29.4 | 261.6 | 1,232 | 91123124 |

Table 7-10. Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation AAQS Screening Analyses, Crop Season Only

| Pollutant/ Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] Direction (degrees) | Receptor Location [b] Distance (m) | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| **CO** | | | | |
| HSH 8-Hour | 5,919.1 | 271.0 | 1,219 | 87112708 |
| | 6,715.9 | 271.0 | 1,219 | 88102808 |
| | 5,640.4 | 248.6 | 1,310 | 89011324 |
| | 6,511.4 | 271.0 | 1,219 | 90112224 |
| | 6,646.2 | 300.6 | 1,416 | 91040808 |
| HSH 1-Hour | 24,422.8 | 71.8 | 2,054 | 87011003 |
| | 23,037.9 | 74.5 | 2,025 | 88022823 |
| | 23,747.4 | 77.2 | 2,000 | 89020202 |
| | 23,654.3 | 77.2 | 2,000 | 90020803 |
| | 22,831.1 | 71.8 | 2,054 | 91101122 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, 2nd-Highest Concentration in 5 years.

Table 7-11. Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation AAQS Refined Analyses, Crop Season Only

| Pollutant/ Averaging Time | Concentration (µg/m³) Total | Modeled | Background | Receptor Location [b] Direction (degrees) | Distance (m) | Time Period (YYMMDDHH) | Florida AAQS (µg/m³) |
|---|---|---|---|---|---|---|---|
| **$SO_2$** | | | | | | | |
| Annual [c] | 44.8 | 39.8 | 5 | 252.0 | 4,000 | 87123124 | |
| | 43.5 | 38.5 | 5 | 249.0 | 4,000 | 88123124 | 60 |
| | 44.2 | 39.2 | 5 | 247.0 | 4,000 | 89123124 | |
| | 42.6 | 37.6 | 5 | 266.3 | 1,222 | 90123124 | |
| HSH 24-Hour | 166.4 | 153.4 | 13 | 263.0 | 4,000 | 88121724 | 260 |
| HSH 3-Hour | 491.5 | 444.5 | 47 | 80.0 | 1,981 | 87040306 | |
| | 482.0 | 435.0 | 47 | 77.2 | 2,000 | 89042103 | 1,300 |
| | 514.9 | 467.9 | 47 | 74.5 | 2,025 | 91032406 | |
| **$PM_{10}$** | | | | | | | |
| Annual [c] | 32.3 | 13.3 | 19 | 134.4 | 1,750 | 87123124 | |
| | 33.8 | 14.8 | 19 | 271.0 | 1,219 | 88123124 | 50 |
| | 37.9 | 18.9 | 19 | 266.3 | 1,222 | 90123124 | |
| | 32.0 | 13.0 | 19 | 261.6 | 1,232 | 91123124 | |
| H6H 24-Hour | 104.1 | 68.1 | 36 | 257.1 | 1,251 | 91111524 | 150 |
| **$NO_2$** | | | | | | | |
| Annual [c] | 59.4 | 29.4 | 30 | 134.4 | 1,750 | 87123124 | |
| | 62.7 | 32.7 | 30 | 271.0 | 1,219 | 88123124 | |
| | 60.1 | 30.1 | 30 | 275.7 | 1,225 | 89123124 | 100 |
| | 68.6 | 38.6 | 30 | 266.3 | 1,222 | 90123124 | |
| | 59.4 | 29.4 | 30 | 261.6 | 1,232 | 91123124 | |
| **CO** | | | | | | | |
| 8-Hour | 9,936 | 6,715.9 | 3,220 | 271.0 | 1,219 | 88102808 | |
| | 9,731 | 6,511.4 | 3,220 | 271.0 | 1,219 | 90112224 | 10,000 |
| | 9,866 | 6,646.2 | 3,220 | 300.6 | 1,416 | 91040808 | |
| 1-Hour | 29,023 | 24,422.8 | 4,600 | 71.8 | 2,054 | 87011003 | |
| | 27,638 | 23,037.9 | 4,600 | 74.5 | 2,025 | 88022823 | |
| | 28,347 | 23,747.4 | 4,600 | 77.2 | 2,000 | 89020202 | 40,000 |
| | 28,254 | 23,654.3 | 4,600 | 77.2 | 2,000 | 90020803 | |
| | 27,431 | 22,831.1 | 4,600 | 71.8 | 2,054 | 91101122 | |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, 2nd-Highest Concentration in 5 years.

Table 7-12. Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation PSD Class II Increment Screening Analyses, Crop Season Only

| Pollutant/ Averaging Time | Concentration [a] ($\mu g/m^3$) | Receptor Location [b] Direction (degrees) | Distance (m) | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| **$SO_2$** | | | | |
| Annual [c] | 10.7 | 250.0 | 4,000 | 87123124 |
| | 9.8 | 250.0 | 4,000 | 88123124 |
| | 9.0 | 250.0 | 4,000 | 89123124 |
| | 6.2 | 250.0 | 4,000 | 90123124 |
| | 6.7 | 250.0 | 4,000 | 91123124 |
| HSH 24-Hour | 57.8 | 280.0 | 4,000 | 87011124 |
| | 68.3 | 260.0 | 4,000 | 88121724 |
| | 61.1 | 260.0 | 4,000 | 89120424 |
| | 49.6 | 250.0 | 4,000 | 90102624 |
| | 52.8 | 250.0 | 4,000 | 91031024 |
| HSH 3-Hour | 197.5 | 290.0 | 4,000 | 87121603 |
| | 185.1 | 260.0 | 4,000 | 88102209 |
| | 179.0 | 260.0 | 3,000 | 89121124 |
| | 173.0 | 280.0 | 4,000 | 90102309 |
| | 172.3 | 270.0 | 4,000 | 91020815 |
| **$PM_{10}$** | | | | |
| Annual [c] | 2.1 | 266.3 | 1,222 | 87123124 |
| | 2.7 | 266.3 | 1,222 | 88123124 |
| | 2.1 | 270.0 | 1,500 | 89123124 |
| | 3.7 | 266.3 | 1,222 | 90123124 |
| | 2.5 | 244.6 | 1,350 | 91123124 |
| HSH 24-Hour | 23.4 | 248.6 | 1,310 | 87110824 |
| | 24.2 | 266.3 | 1,222 | 88122024 |
| | 21.9 | 248.6 | 1,310 | 89021624 |
| | 27.8 | 240.9 | 1,396 | 90100924 |
| | 28.2 | 257.1 | 1,251 | 91102424 |
| **$NO_2$** | | | | |
| Annual [c] | 15.4 | 134.4 | 1,750 | 87123124 |
| | 17.9 | 271.0 | 1,219 | 88123124 |
| | 15.4 | 275.7 | 1,225 | 89123124 |
| | 23.3 | 266.3 | 1,222 | 90123124 |
| | 16.3 | 261.6 | 1,232 | 91123124 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, 2nd-Highest Concentration in 5 years.

Table 7-13. Maximum Pollutant Impacts Predicted for All Future Sources for the Simultaneous Operation PSD Class II Increment Refined Analyses, Crop Season Only

| Pollutant/ Averaging Time | Concentration [a] (µg/m3) | Receptor Location [b] Direction (degrees) | Receptor Location [b] Distance (m) | Time Period (YYMMDDHH) | PSD Class II Increments (µg/m$^3$) |
|---|---|---|---|---|---|
| **$SO_2$** | | | | | |
| Annual [c] | 10.9 | 253.0 | 4,000 | 87123124 | |
| | 9.8 | 249.0 | 4,000 | 88123124 | |
| | 9.0 | 250.0 | 4,000 | 89123124 | 20 |
| | 6.2 | 250.0 | 4,000 | 90123124 | |
| | 6.7 | 250.0 | 4,000 | 91123124 | |
| HSH 24-Hour | 70.6 | 263.0 | 4,000 | 88121724 | 91 |
| HSH 3-Hour | 219.3 | 265.0 | 4,000 | 87042109 | |
| | 207.9 | 284.0 | 4,000 | 88110409 | 512 |
| | 207.0 | 287.0 | 4,000 | 89010406 | |
| **$PM_{10}$** | | | | | |
| Annual [c] | 2.1 | 266.3 | 1,222 | 87123124 | |
| | 3.7 | 266.3 | 1,222 | 90123124 | 17 |
| | 2.5 | 244.6 | 1,350 | 91123124 | |
| HSH 24-Hour | 27.8 | 240.9 | 1,396 | 90100924 | 30 |
| | 28.2 | 257.1 | 1,251 | 91102424 | |
| **$NO_2$** | | | | | |
| Annual [c] | 15.4 | 134.4 | 1,750 | 87123124 | |
| | 17.9 | 271.0 | 1,219 | 88123124 | 25 |
| | 15.4 | 275.7 | 1,225 | 89123124 | |
| | 23.3 | 266.3 | 1,222 | 90123124 | |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

[c] Annual impacts are conservatively represented by the sum of the maximum predicted impacts from the crop and off-crop season impacts. Receptors locations are represented by where the maximum impact occurred during the crop season.

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, 2nd-Highest Concentration in 5 years.

Table 7-14. Summary of Maximum Pollutant Concentrations Predicted for the Simultaneous Operations Compared to the EPA Class I Significant Impact Levels and PSD Class I Increments

| Pollutant | Averaging Time | Maximum Concentration[a] ($\mu g/m^3$) | EPA Class I Significant Impact Levels ($\mu g/m^3$) | PSD Class I Increments ($\mu g/m^3$) |
|---|---|---|---|---|
| $SO_2$ | Annual | 0.0031 | 0.1 | 2 |
| | 24-Hour | 0.43 | 0.2 | 5 |
| | 3-Hour | 1.65 | 1.0 | 25 |
| $PM_{10}$ | Annual | 0.0020 | 0.2 | 4 |
| | 24-Hour | 0.084 | 0.3 | 8 |
| $NO_2$ | Annual | 0.0040 | 0.1 | 2.5 |

[a] Highest concentration predicted with CALPUFF model and CALMET South Florida Domain, 1990.

Table 7-15. Maximum 3-Hour and 24-Hour Average $SO_2$ PSD Increments Predicted for Simultaneous Operation at the Everglades National Park

| Averaging Time | Maximum Concentration[a] ($ug/m^3$) | Receptor Location (m) | | Period Ending (Julian day/ hour/year) | Allowable PSD Class I Increments ($ug/m^3$) |
|---|---|---|---|---|---|
| | | UTM East | UTM North | | |
| 24-Hour | 3.81 | 534000 | 2848600 | (1990, 317, 2300) | 5 |
| 3-Hour | 19.22 | 550500 | 2844000 | (1990, 188, 0800) | 25 |

[a] Concentrations are second-highest predicted with CALPUFF model and CALMET South Florida Domain, 1990.

Notes:
m = meter
UTM = Universal Transverse Mercator
$ug/m^3$ = micrograms per cubic meter

Table 7-16. Maximum Predicted Increase in Fluoride Impacts Due to the Simultaneous Operations at the Site Vicinity

| Averaging Period | Concentration[a] (µg/m³) | Receptor Location[b] | | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| | | Direction (degree) | Distance (m) | |
| Annual | 0.0040 | 300 | 3,000 | 87123124 |
| | 0.0042 | 156 | 1,937 | 88123124 |
| | 0.0041 | 300 | 3,000 | 89123124 |
| | 0.0047 | 300 | 3,000 | 90123124 |
| | 0.0045 | 300 | 2,000 | 91123124 |
| High 24-Hour | 0.062 | 217 | 1,278 | 87053024 |
| | 0.049 | 159 | 1,898 | 88020924 |
| | 0.050 | 329 | 2,360 | 89060924 |
| | 0.049 | 220 | 1,340 | 90041324 |
| | 0.050 | 220 | 1,340 | 91100824 |
| High 8-Hour | 0.12 | 217 | 1,278 | 87053016 |
| | 0.10 | 262 | 1,232 | 88061816 |
| | 0.09 | 266 | 1,222 | 89051916 |
| | 0.10 | 167 | 1,051 | 90011316 |
| | 0.10 | 307 | 1,528 | 91072416 |
| High 3-Hour | 0.17 | 200 | 1,087 | 87082312 |
| | 0.17 | 153 | 1,980 | 88052709 |
| | 0.18 | 167 | 1,051 | 89102612 |
| | 0.16 | 271 | 1,219 | 90070712 |
| | 0.16 | 289 | 1,290 | 91082912 |
| High 1-Hour | 0.29 | 310 | 2,000 | 87051007 |
| | 0.23 | 15 | 3,087 | 88081010 |
| | 0.27 | 280 | 1,239 | 89073011 |
| | 0.29 | 146 | 2,132 | 90071712 |
| | 0.25 | 180 | 2,000 | 91102108 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 7-17. Maximum Predicted Increase in Sulfuric Acid Mist Impacts Due to the Simultaneous Operations at the Site Vicinity

| Averaging Period | Concentration[a] ($\mu g/m^3$) | Receptor Location[b] | | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| | | Direction (degree) | Distance (m) | |
| Annual | 0.041 | 297 | 1,368 | 87123124 |
| | 0.047 | 162 | 1,078 | 88123124 |
| | 0.045 | 297 | 1,368 | 89123124 |
| | 0.047 | 297 | 1,368 | 90123124 |
| | 0.048 | 297 | 1,368 | 91123124 |
| High 24-Hour | 1.67 | 217 | 1,278 | 87053024 |
| | 1.42 | 159 | 1,898 | 88020924 |
| | 1.41 | 329 | 2,360 | 89060924 |
| | 1.33 | 220 | 1,340 | 90041324 |
| | 1.37 | 220 | 1,340 | 91100824 |
| High 8-Hour | 3.16 | 217 | 1,278 | 87053016 |
| | 2.83 | 262 | 1,232 | 88061816 |
| | 2.47 | 253 | 1,277 | 89072516 |
| | 2.68 | 167 | 1,051 | 90011316 |
| | 2.73 | 307 | 1,528 | 91072416 |
| High 3-Hour | 4.73 | 200 | 1,087 | 87082312 |
| | 4.62 | 162 | 1,078 | 88040603 |
| | 4.82 | 167 | 1,051 | 89102612 |
| | 4.39 | 163 | 1,249 | 90112603 |
| | 4.43 | 289 | 1,290 | 91082912 |
| High 1-Hour | 7.68 | 310 | 2,000 | 87051007 |
| | 7.62 | 162 | 1,078 | 88072802 |
| | 7.51 | 162 | 1,078 | 89073106 |
| | 7.75 | 146 | 2,132 | 90071712 |
| | 7.64 | 162 | 1,078 | 91082802 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

Table 7-18. Maximum Predicted Increase in Lead Impacts Due to the Simultaneous Operations at the Site Vicinity

| Averaging Period | Concentration[a] (μg/m³) | Receptor Location[b] | | Time Period (YYMMDDHH) |
|---|---|---|---|---|
| | | Direction (degree) | Distance (m) | |
| Annual | 0.0009 | 300 | 2,000 | 87123124 |
| | 0.0010 | 162 | 1,154 | 88123124 |
| | 0.0009 | 300 | 2,000 | 89123124 |
| | 0.0010 | 300 | 3,000 | 90123124 |
| | 0.0010 | 300 | 2,000 | 91123124 |
| High 24-Hour | 0.013 | 217 | 1,278 | 87053024 |
| | 0.011 | 159 | 1,898 | 88020924 |
| | 0.011 | 329 | 2,360 | 89060924 |
| | 0.010 | 220 | 1,340 | 90041324 |
| | 0.011 | 220 | 1,340 | 91100824 |
| High 8-Hour | 0.025 | 217 | 1,278 | 87053016 |
| | 0.022 | 262 | 1,232 | 88061816 |
| | 0.019 | 266 | 1,222 | 89051916 |
| | 0.021 | 167 | 1,051 | 90011316 |
| | 0.021 | 307 | 1,528 | 91072416 |
| High 3-Hour | 0.037 | 200 | 1,087 | 87082312 |
| | 0.036 | 153 | 1,980 | 88052709 |
| | 0.038 | 167 | 1,051 | 89102612 |
| | 0.033 | 271 | 1,219 | 90070712 |
| | 0.035 | 289 | 1,290 | 91082912 |
| High 1-Hour | 0.060 | 310 | 2,000 | 87051007 |
| | 0.050 | 153 | 1,980 | 88022508 |
| | 0.057 | 280 | 1,239 | 89073011 |
| | 0.061 | 146 | 2,132 | 90071712 |
| | 0.053 | 180 | 2,000 | 91102108 |

[a] Based on 5-year meteorological record, West Palm Beach, 1987 to 1991.

[b] Relative to midpoint of Cogen Boilers No. 1 and 2.

Note:
YYMMDDHH = Year, Month, Day, Hour Ending.

# 8.0 ADDITIONAL IMPACT ANALYSIS

## 8.1 VICINITY OF PALM BEACH POWER CORP.

In Section 7.0, it was demonstrated that simultaneous operation of PBPC and Osceola Farms sugar mill results in the highest increase in impacts due to the proposed project. As a result, throughout this section, the analysis will address impacts due to simultaneous operation. It is noted that these impacts will only exist for an approximate one-year period, after which simultaneous operation will no longer occur and impacts will be reduced.

### 8.1.1 VEGETATION AND SOILS

The primary vegetation, as well as agricultural crop, in the vicinity of Palm Beach Power Corp. is sugar cane. The site is surrounded by sugar cane fields for a large distance in all directions. Some rice fields, vegetable farming, nurseries and sod farms are also located in the general area.

Soils in the area are primarily histosols, which are peat soils with high amounts of organic matter. The surrounding area is part of the Everglades Agricultural Area, which is noted for its "muck", i.e., rich, black soil which is very fertile.

As described in the air quality impact analysis (Section 7.0), the maximum predicted $SO_2$, $NO_2$ and CO concentrations in the vicinity of Palm Beach Power as a result of the proposed project are predicted to be 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.

The maximum predicted increase in $PM_{10}$ concentrations in the vicinity of Palm Beach Power as a result of the proposed project are predicted to be below the significant impact levels. Therefore, no detrimental impact on soils or vegetation are expected to occur as a result of this project.

### 8.1.2 VISIBILITY

The PBPC boilers will be controlled by mechanical dust collectors and ESPs. The boilers are subject to opacity limitations, and will have continuous opacity monitors. As a result, visible emissions will be limited. The nearest residence is several miles away. Therefore, no adverse impacts upon visibility in the vicinity of Palm Beach Power are expected.

### 8.1.3 IMPACTS DUE TO ASSOCIATED GROWTH

Since the PBPC boilers are existing boilers that have been shutdown, and most of the equipment needed for operation has already been constructed, there should only be a small temporary increase in the number of workers at the site. There will also be an increase in the number of permanent employees (approximately 40) as a result of the proposed project. However, this will have a very small impact on the surrounding community, as many of these workers will come from Osceola Farms Company.

A small increase in the number of trucks traveling to the site will increase, due to biomass fuel and fuel oil deliveries, and deliveries of other plant consumables, part and equipment.

No negative or significant impacts on air quality caused by this associated growth is anticipated.

## 8.2 PSD CLASS I AREA

The potential impacts of $SO_2$, $NO_2$, Pb, F, and SAM on soils, vegetation, wildlife, and visibility in the Everglades National Park (ENP) Class I area are addressed in this section. This section focuses on the ecological effects of the proposed facility modification on Air Quality Related Values (AQRV), as defined under PSD regulations, in the ENP. The ENP is the closest Class I area to PBPC, and is located approximately 119 km south of PBPC. 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 national park and bioindicators of air pollution (e.g., lichens) are also evaluated.

The maximum predicted atmospheric concentrations due to the increase in emissions resulting from the proposed project are presented in Table 8-1 (refer to Section 7.0 also). Impacts due to simultaneous operation are shown in Table 8-2. As shown, the predicted increase in impacts is very low for all pollutants considered. Simultaneous operation results in the highest predicted impacts on the Class I area. As a result, impacts on AQRVs due to simultaneous operations will be addressed in this section.

### 8.2.1 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.

The soils of the Everglades National Park are generally classified as histosols or entisols. 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 entisols are shallow sandy soils overlying limestone, such as the soils found in the pinelands. The direct connection of these soils with subsurface limestone tends to neutralize any acidic inputs. Moreover, the groundwater table is highly buffered due to the interaction with subsurface limestone formations, which results in high alkalinity (as $CaCO_3$).

The relatively low sensitivity of the soils to acid inputs coupled with the extremely low ground-level concentrations of contaminants projected for the Everglades National Park from the PBPC facility emissions precludes any significant impact on soils.

### 8.2.2 IMPACTS TO VEGETATION

The maximum predicted gaseous concentrations ($\mu g/m^3$) of $SO_2$, $NO_2$, Be, F, and SAM 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.

#### 8.2.2.1 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 8-3 and 8-4, 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 ranging from 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 ranging from 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 the park area 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).

The 8-hour modeled incremental $SO_2$ increase from the simultaneous operation (0.77 $\mu g/m^3$) can be added to the upper range of existing background $SO_2$ concentrations (0.72 $\mu g/m^3$; refer to Section 4.5) to obtain a maximum of 1.49 $\mu g/m^3$ of $SO_2$. This is the maximum concentration expected in the ENP. Upon comparison of this concentration to those causing injury to native species, it is evident that $SO_2$-sensitive species (or more tolerant species) would not be damaged by the predicted concentration. By comparing the $SO_2$ concentration of 1.49 $\mu g/m^3$ with the concentrations that cause plant injury, it can be shown that the amount of $SO_2$ in the park area is only 1 percent of the most conservative concentration (200 $\mu g/m^3$) that caused injury to $SO_2$-sensitive species.

The 24-hour and annual $SO_2$ concentrations predicted within the ENP due to the simultaneous operation (0.43 and 0.0031 $\mu g/m^3$, respectively), when added to background concentrations of 0.72 and 0.13 $\mu g/m^3$, respectively, result in total $SO_2$ impacts of 1.15 and 0.133 $\mu g/m^3$, respectively. These levels are much lower than those known to cause damage to test species. Jack pine seedlings exposed to $SO_2$ concentrations of 470 to 520 $\mu g/m^3$ for 24 hours demonstrated inhibition of foliar lipid synthesis; however, this inhibition was reversible (Malhotra and Kahn, 1978). Black oak exposed to 1,310 $\mu g/m^3$ $SO_2$ for 24 hours a day for 1 week demonstrated a 48 percent reduction in photosynthesis (Carlson, 1979). By comparison of these levels, it is apparent that the modeled 24-hour incremental increase of $SO_2$ is well below (i.e., less than 2 percent) the concentrations that caused damage in $SO_2$-sensitive plants. The modeled annual incremental increase in $SO_2$ (0.0031 $\mu g/m^3$) adds slightly to background levels of this gas and poses no threat to area vegetation.

#### 8.2.2.2 Nitrogen Dioxide

Nitrogen dioxide ($NO_2$) 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 $\mu g/m^3$ (Heck and Tingey, 1979). Chronic exposure of selected plants (some considered $NO_2$-sensitive) to $NO_2$ concentrations ranging from 2,000 to 4,000 $\mu g/m^3$ for 213 to 1,900 hours caused reductions in yield of up to 37 percent and some chlorosis (Zahn, 1975).

By comparison of published toxicity values for $NO_2$ exposure to short-term (i.e., 1-, 3-, and 8-hour averaging times) and long-term (annual averaging time) modeled concentrations, the possibility of plant damage in the ENP can be examined for both acute and chronic exposure situations, respectively. The 1-, 3-, and 8-hour estimated increased $NO_2$ concentrations due to the simultaneous operations at the point of maximum impact in the park area are 0.999, 0.766, and 0.532 $\mu g/m^3$, respectively. These concentrations are less than 0.1 percent of the levels that could potentially injure 5 percent of the plant foliage. For a chronic exposure, the annual estimated $NO_2$ concentration due to the simultaneous operation at the point of maximum impact in the ENP (0.0040 $\mu g/m^3$) is less than 0.001 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 concentrations within the ENP are still far below the levels that potentially cause plant injury for either acute or chronic exposure.

#### 8.2.2.3 Fluoride

Fluoride is an inhibitor of plant metabolism. As fluoride accumulates in plants, it causes an inhibition of plant metabolism and chlorosis (a yellowing of the leaf). With further increases in

accumulation of fluoride, the cells die and necrosis is observed. Leaf tips and margins accumulate the highest concentrations of fluoride and are the sites of initial visible injury. Gaseous fluoride is taken up primarily through the stomata of transpiring plants. There is negligible contribution to leaf fluoride content by uptake by roots (Applied Sciences Associates, Inc., 1978).

The sensitivity of plants varies widely. Presented in Table 8-5 are fluoride effect levels for various plant species. Gladiolus are considered the most sensitive. Visible symptoms are reported to occur when gladiolus have been exposed to concentrations >0.5 $\mu g/m^3$ for 5 to 10 days. More tolerant fruit tree species and conifers first showed symptoms at around 1 $\mu g/m^3$ at 10-day exposures (Treshow and Anderson, 1989). Plant sensitivities can range from 16 $\mu g/m^3$ of fluoride in sensitive plants to 500 $\mu g/m^3$ of fluoride in tolerant plants for 3-hour exposures. The lowest observed effect levels for sensitive plants are reported to be as follows (Applied Sciences Associates, Inc., 1978):

- <50 $\mu g/m^3$ for 1-hour exposures
- <16 $\mu g/m^3$ for 3-hour exposures
- <1.6 $\mu g/m^3$ for 24-hour exposures

Data suggest that a fluoride accumulation factor might be calculated under fumigation conditions with an uncertainty factor of less than 2. One study indicated that hydrogen fluoride concentrations of 0.3 $\mu g/m^3$ would lead to an accumulation of up to 20 ppm of fluoride in conifer foliage after 2 years of exposure (Treshow and Anderson, 1989).

The predicted maximum increase in 1-hour, 3-hour, 8-hour, 24-hour, and annual fluoride concentrations in the ENP due to the simultaneous operation are 0.0055, 0.0043, 0.0029, 0.0017, 0.00005 $\mu g/m^3$, respectively (refer to Table 8-2). These predicted values are well below the lowest observed effect levels for sensitive vegetation. No significant adverse effects are predicted to occur to the vegetative AQRVs of ENP. Since the predicted annual concentration is very low, no measurable accumulation of fluoride will occur in vegetation that would be the prime forage of wildlife. Therefore, no significant adverse effects to wildlife AQRVs will occur (see also Section 8.2.3).

#### 8.2.2.4 Sulfuric Acid Mist

Acidic precipitation or acid rain is coupled to $SO_2$ emissions mainly formed during the burning of fossil fuels. This pollutant is oxidized in the atmosphere and dissolves in rain forming sulfuric acid

mist which falls as acidic precipitation (Ravera, 1989). Although concentration data are not available, sulfuric acid mist has been reported to yield necrotic spotting on the upper surfaces of leaves (Middleton *et al.*, 1950).

No significant adverse effects on vegetation are expected from the project's emissions because $SO_2$ concentrations, which lead directly to the formation of sulfuric acid mist concentrations, are predicted to be well below levels which have been documented as negatively affecting vegetation. During the last decade, much attention has been focused on acid rain. Acidic deposition is an ecosystem-level problem that affects vegetation because of some alterations of soil conditions such as increased leaching of essential base cations or elevated concentrations of aluminum in the soil water (Goldstein *et al.*, 1985). Although effects of acid rain in eastern North America have been well published and publicized, detrimental effects of acid rain on Florida vegetation are lacking documentation.

#### 8.2.2.5 Lead

The maximum increase in 24-hour average ambient Pb concentrations due to the simultaneous operation is predicted to be $3.63 \times 10^{-4}$ µg/m$^3$. Naturally occurring levels of Pb in plants range from 0.1 to 10 µg/g, with an average of 2 µg/g (Kabata-Pendias and Pendias, 1984). A Pb soil concentration of 30 to 100 µg/g generally retards the growth of plants (Gough et al, 1979). By comparison of these effects levels with the maximum predicted impacts due to the proposed facility, it is concluded that the low levels of Pb predicted from the proposed project are not expected to adversely affect vegetation.

#### 8.2.2.6 Summary

In summary, the phytotoxic effects on the ENP from the proposed PBPC project emissions are expected to be minimal. The increase in ambient impacts on the ENP are predicted to be very low. It is important to note that the substances were evaluated with the assumption that 100 percent was available for plant uptake. This is rarely the case in a natural ecosystem.

### 8.2.3 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 8-5.

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 8-6. These values are up to orders of magnitude larger than maximum predicted concentrations for the Class I area. Therefore, no effects are predicted to occur as a result of the proposed project (Newman, 1975).

No effects on wildlife AQRVs from $SO_2$, $NO_x$, Pb, SAM or fluorides are expected. These results are considered indications of the risk of other air pollutant emissions predicted from the facility.

### 8.2.4 IMPACTS ON VISIBILITY

#### 8.2.4.1 Introduction

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. Sources of air pollution can cause visible plumes due to emissions of $PM_{10}$ and $NO_x$. A plume can 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 Everglades NP. Visibility can take the form of plume blight for nearby areas or regional haze for long distances (e.g., distances beyond 50 km). Because the Everglades NP is more than 50 km from the PBPC project site, the change in visibility is 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 who are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized 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 PBPC project.

### 8.2.4.2 Analysis Methodology

**General**

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 Project. The criteria to determine if the 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 (see Appendix G) 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 project. Daily background extinction coefficients are calculated on a hour-by-hour basis using hourly relative humidity data from CALMET and hygroscopic and non-hygroscopic extinction components specified in the FLAG document. CALPOST then predicts the percent extinction change for each day of the year.

**Emission Inventory**

Based on recommendations of the FLAG Phase I Report (December 2000), the regional haze analysis considered only the maximum 24-hour increase in emissions due to the proposed PBPC boilers. The emission rates and source parameters used in the regional haze analysis are presented in Section 6.0, Tables 6-3 through 6-8.

**Building Wake Effects**

The air modeling analysis included the same building structure dimensions to account for the effects of building-induced downwash on the emission sources as was used in the ISCST3 modeling analysis. Dimensions for all significant building structures were processed with the Building Profile Input Program (BPIP), Version 95086, and were included in the CALPUFF model.

**Receptor Locations**

Receptors for the refined analysis included 126 discrete receptors located at the ENP PSD Class I area, as described in Section 6.0. Because the area's terrain is flat, all receptors were assumed to be at zero elevation.

**Background Visual Ranges and Relative Humidity Factors**

The regional haze analysis was performed using the latest regulatory guidance as provided in the FLAG Phase I report. Using the hourly meteorological and relative humidity data used with the CALPUFF model, the daily change in background extinction is computed. The hygroscopic and dry

non-hygroscopic components used for calculating the daily background extinction coefficients for the ENP were obtained from the FLAG report. For this analysis, the hygroscopic and dry non-hygroscopic values were 0.9 and 8.5 inverse millimeters ($Mm^{-1}$), respectively.

**Meteorological Data**

A CALMET wind field for the south Florida domain was used for this analysis. The year of data is 1990. A detailed description of the data used to develop the wind field is presented in Appendix G.

**Chemical Transformation**

The air modeling analysis included all chemical transformation processes that occur for the emitted species.

### 8.2.4.3 Results

A refined regional haze analysis was performed for the proposed project. The maximum predicted 24-hour visibility degradation would occur under simultaneous operation, when no credit can be taken for shutdown of the Osceola Farms boilers. Under these operating conditions, the predicted maximum 24-hour visibility degradation was 8.0 percent. Further analysis showed that the second-highest day of visibility degradation resulted in a degradation of 4.5 percent. These results are depicted in Figure 8-1, which shows the frequency distribution of visibility impacts. Therefore, there is only one predicted exceedance of the 5 percent criteria.

For the ultimate operating case of Osceola Farms sugar mill boilers being shutdown and PBPC operating, the maximum 24-hour visibility degradation was predicted to be 2.3 percent. This analysis considered that emission offsets due to shutdown of Osceola Farms would only occur during the sugar cane processing season, since the Osceola Farms boilers do not operate during the off-season.

Based on this analysis, it can be concluded that any occurrence of a 24-hour visibility degradation of greater than 5 percent, due to the proposed PBPC project, will be extremely infrequent, would only occur during the first year of operation, and therefore poses no threat to visibility degradation in the Class I area.

### 8.2.5 SULFUR AND NITROGEN DEPOSITION

**General Methods**

As part of the AQRV analyses, total nitrogen (N) and sulfur (S) deposition rates were predicted at the Everglades NP Class I area. 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).

DAT for nitrogen and sulfur deposition of 0.01 kg/ha/yr were 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. The maximum N and S depositions predicted for the PBPC project are, therefore, compared to these DAT or significant impact levels.

**Results**

The maximum predicted N and S depositions predicted for the Project in the PSD Class I area of the Everglades NP are summarized in Table 8-7 for the project, and in Table 8-8 for simultaneous operation. The maximum N and S deposition rates for either case are predicted to be 0.0026 and 0.0033 kg/ha/yr, respectively. These maximum deposition rates are below the significant impact levels for N and S of 0.01 kg/ha/yr. As a result, the PBPC project is not expected to have a significant adverse effect on N and S deposition in the Class I area.

Table 8-1. Maximum Predicted Concentrations Due to the Project Only at the Class I Area of the Everglades National Park

| Pollutant | Concentrations[a] ($ug/m^3$) for Averaging Times | | | | |
|---|---|---|---|---|---|
| | Annual | 24-Hour | 8-Hour | 3-Hour | 1-Hour |
| Nitrogen Dioxide ($NO_2$) | 0.00127 | 0.0966 | 0.275 | 0.480 | 0.544 |
| Sulfuric Acid Mist (SAM) | 0.000070 | 0.026 | 0.040 | 0.053 | 0.070 |
| Sulfur Dioxide ($SO_2$) | 0.00060 | 0.1752 | 0.3807 | 0.9793 | 1.159 |
| Fluorides (F) | 3.22E-05 | 9.40E-04 | 1.49E-03 | 2.46E-03 | 2.86E-03 |
| Lead (Pb) | 9.26E-06 | 3.15E-04 | 4.94E-04 | 7.56E-04 | 9.85E-04 |

[a] Highest Predicted with CALPUFF model and South Florida CALMET Windfield, 1990.

Table 8-2. Maximum Predicted Concentrations Due to Simultaneous Operation at the Class I Area of the Everglades National Park

| Pollutant | Concentrations[a] ($ug/m^3$) for Averaging Times | | | | |
|---|---|---|---|---|---|
| | Annual | 24-Hour | 8-Hour | 3-Hour | 1-Hour |
| Nitrogen Dioxide ($NO_2$) | 0.0040 | 0.263 | 0.532 | 0.766 | 0.999 |
| Sulfuric Acid Mist (SAM) | 0.00028 | 0.046 | 0.079 | 0.114 | 0.148 |
| Sulfur Dioxide ($SO_2$) | 0.0031 | 0.434 | 0.767 | 1.64 | 2.14 |
| Fluorides (F) | 4.87E-05 | 1.72E-03 | 2.93E-03 | 4.25E-03 | 5.52E-03 |
| Lead (Pb) | 1.03E-05 | 3.63E-04 | 6.18E-04 | 8.95E-04 | 1.16E-03 |

[a] Highest Predicted with CALPUFF model and South Florida CALMET Windfield, 1990.

Table 8-3. $SO_2$ 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 8-4. 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) | Ragweed<br>Legumes<br>Blackberry<br>Southern pines<br>Red and black oaks<br>White ash<br>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<br>Locust<br>Sweetgum<br>Cherry<br>Elms<br>Tuliptree<br>Many crop and garden species |
| Resistant | >5,240 µg/m$^3$ (>2.0 ppm) | >2,100 µg/m$^3$ (>0.8 ppm) | White oaks<br>Potato<br>Upland cotton<br>Corn<br>Dogwood<br>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 8-6. Examples of Reported Effects of Air Pollutants on Animals 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 8-7. Maximum Sulfur and Nitrogen Deposition Predicted for the Project at the Everglades National Park PSD Class I Area

| Species | Maximum Predicted Deposition ($ug/m^2/s$) Dry | Wet | Total | Species Molecular Weight (MW) | Conversion of Species to Nitrogen (N) or Sulfur (S): Basis | Deposition Molecule | No. of Deposition Molecules | Deposition Molecule MW | Ratio MW Dep. Molecule to Species | Deposition [a] (kg/ha/yr) N | S | Threshold Criteria [b] (kg/ha/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nitrogen (N) deposition** | | | | | | | | | | | | |
| Nitrate ($NO_3$) | 4.838E-09 | 4.877E-07 | 4.925E-07 | 62 | Ammonium nitrate ($NH_4NO_3$) | N | 2 | 28 | 0.452 | 0.00007 | | |
| Nitric acid ($HNO_3$) | 3.865E-06 | 1.143E-05 | 1.529E-05 | 63 | $HNO_3$ | N | 1 | 14 | 0.222 | 0.001072 | | |
| Nitrogen oxides ($NO_x$ as $NO_2$) | 2.021E-06 | NA | 2.021E-06 | 46 | $NO_2$ | N | 1 | 14 | 0.304 | 0.000194 | | |
| Sulfate ($SO_4$) | 2.593E-08 | 5.259E-06 | 5.285E-06 | 96 | Ammonium sulfate ($(NH_4)_2SO_4$) | N | 2 | 28 | 0.292 | 0.00049 | | |
| TOTAL | | | | | | | | | | 0.0018 | | 0.01 |
| **Sulfur (S) deposition** | | | | | | | | | | | | |
| Sulfur dioxide ($SO_2$) | 1.883E-06 | 7.884E-06 | 9.767E-06 | 64 | $SO_2$ | S | 1 | 32 | 0.500 | | 0.00154 | |
| Sulfate ($SO_4$) | 2.593E-08 | 5.259E-06 | 5.285E-06 | 96 | Ammonium sulfate ($(NH_4)_2SO_4$) | S | 1 | 32 | 0.333 | | 0.00056 | |
| TOTAL | | | | | | | | | | | 0.0021 | 0.01 |

[a] Deposition is calculated by multiplying maximum predicted total deposition ($ug/m^2/s$) for total species by ratio of molecular weights of deposition molecule to species by conversion factor.
Conversion factor is used to convert $ug/m^2/s$ to kg/hectare (ha)/yr using following units:

| | | | | |
|---|---|---|---|---|
| $ug/m^2/s$ | x | 0.000001 | g/ug | |
| | x | 0.001 | kg/g | |
| | x | 10000 | $m^2$/hectare | |
| | x | 3600 | sec/hr | |
| | x | 8760 | hr/yr | = kg/ha/yr |
| or | | | | |
| $ug/m^2/s$ | x | 315.36 | = kg/ha/yr | |

[b] Criteria for nitrogen deposition provided by the U.S. Fish and Wildlife Service, September 2001; for sulfur dioxide deposition, U.S. Forest Service.
For nitrogen, criteria is developed by multiplying natural background nitrogen deposition of 0.5 kg/ha/yr (for Eastern U.S. Class I areas) by 50 percent (variability factor) and by 4 percent (cumulative factor).
Cumulative factor is based on EPA's method for determining significant impacts in PSD Class I which are 4 percent of Class I increments.
For sulfur, criteria is currently based on 1/1000 of 3 kg/ha/yr which is minimum potential loading level to protect sensitive ecosystems.

Table 8-8. Maximum Sulfur and Nitrogen Deposition Predicted for the Simultaneous Operation at the Everglades National Park PSD Class I Area

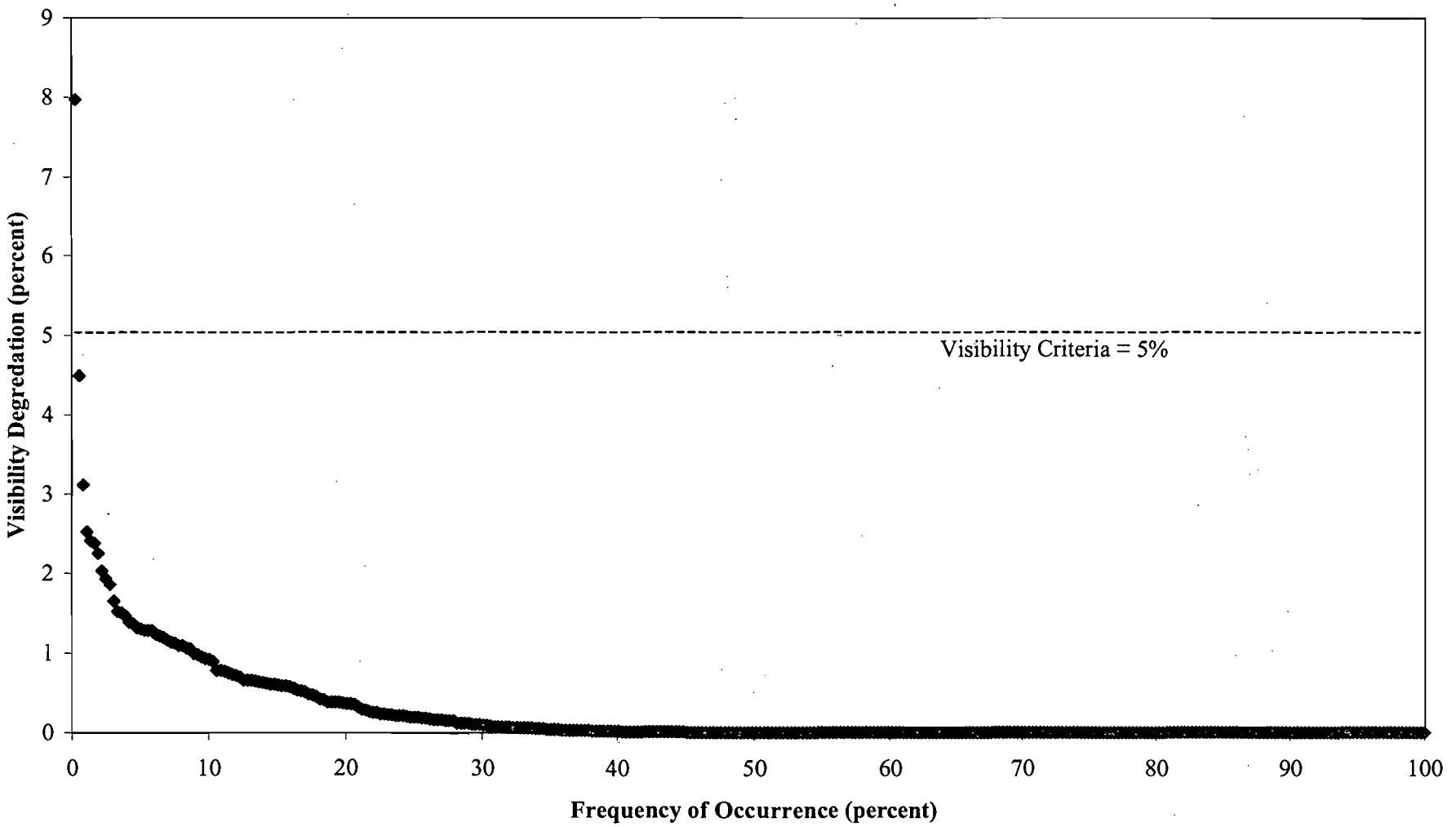
| Species | Maximum Predicted Deposition ($ug/m^2/s$) Dry | Wet | Total | Species Molecular Weight (MW) | Conversion of Species to Nitrogen (N) or Sulfur (S) Basis | Deposition Molecule | No. of Deposition Molecules | Deposition Molecule MW | Ratio MW Dep. Molecule to Species | Deposition [a] (kg/ha/yr) N | S | Threshold Criteria [b] (kg/ha/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nitrogen (N) deposition** | | | | | | | | | | | | |
| Nitrate ($NO_3$) | 1.858E-08 | 5.429E-07 | 5.615E-07 | 62 | Ammonium nitrate ($NH_4NO_3$) | N | 2 | 28 | 0.452 | 0.00008 | | |
| Nitric acid ($HNO_3$) | 7.585E-06 | 1.195E-05 | 1.954E-05 | 63 | $HNO_3$ | N | 1 | 14 | 0.222 | 0.001369 | | |
| Nitrogen oxides ($NO_x$ as $NO_2$) | 6.198E-06 | NA | 6.198E-06 | 46 | $NO_2$ | N | 1 | 14 | 0.304 | 0.000595 | | |
| Sulfate ($SO_4$) | 8.200E-08 | 5.593E-06 | 5.675E-06 | 96 | Ammonium sulfate ($(NH_4)_2SO_4$) | N | 2 | 28 | 0.292 | 0.00052 | | |
| TOTAL | | | | | | | | | | 0.0026 | | 0.01 |
| **Sulfur (S) deposition** | | | | | | | | | | | | |
| Sulfur dioxide ($SO_2$) | 8.849E-06 | 8.477E-06 | 1.733E-05 | 64 | $SO_2$ | S | 1 | 32 | 0.500 | | 0.00273 | |
| Sulfate ($SO_4$) | 8.200E-08 | 5.593E-06 | 5.675E-06 | 96 | Ammonium sulfate ($(NH_4)_2SO_4$) | S | 1 | 32 | 0.333 | | 0.00060 | |
| TOTAL | | | | | | | | | | | 0.0033 | 0.01 |

[a] Deposition is calculated by multiplying maximum predicted total deposition ($ug/m^2/s$) for total species by ratio of molecular weights of deposition molecule to species by conversion factor.
Conversion factor is used to convert $ug/m^2/s$ to kg/hectare (ha)/yr using following units:

| | | | |
|---|---|---|---|
| $ug/m^2/s$ x | 0.000001 | g/ug | |
| x | 0.001 | kg/g | |
| x | 10000 | $m^2$/hectare | |
| x | 3600 | sec/hr | |
| x | 8760 | hr/yr | = kg/ha/yr |
| or | | | |
| $ug/m^2/s$ x | 315.36 | = kg/ha/yr | |

[b] Criteria for nitrogen deposition provided by the U.S. Fish and Wildlife Service, September 2001; for sulfur dioxide deposition, U.S. Forest Service.
For nitrogen, criteria is developed by multiplying natural background nitrogen deposition of 0.5 kg/ha/yr (for Eastern U.S. Class I areas) by 50 percent (variability factor) and by 4 percent (cumulative factor).
Cumulative factor is based on EPA's method for determining significant impacts in PSD Class I which are 4 percent of Class I increments.
For sulfur, criteria is currently based on 1/1000 of 3 kg/ha/yr which is minimum potential loading level to protect sensitive ecosystems.

**Figure 8-1. Annual Frequency of 24-Hour Visibility Impairment At the Everglades National Park Due to the Simultaneous Operation at Palm Beach Power Corp.**

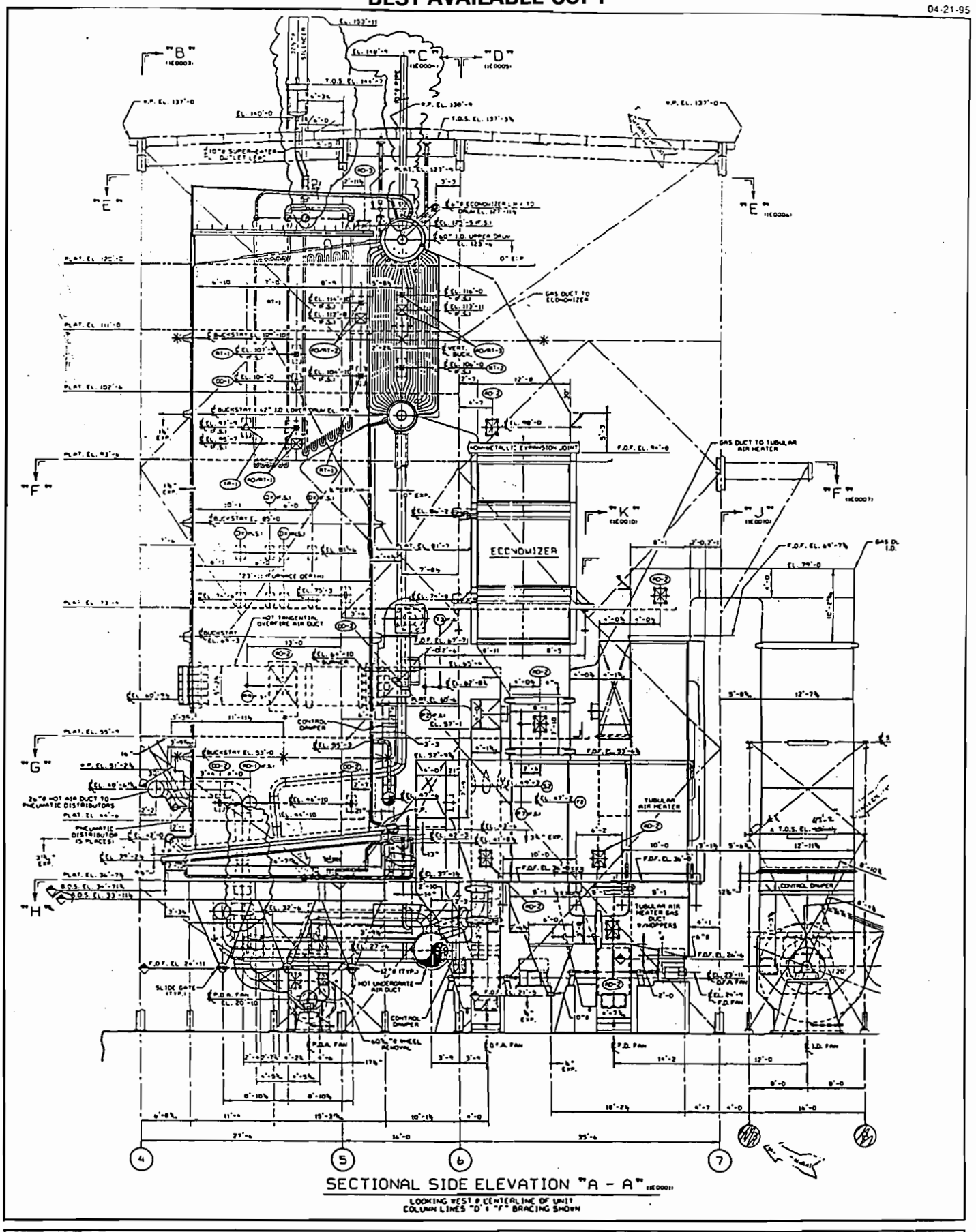


# APPENDIX A

# FACILITY DESIGN DATA

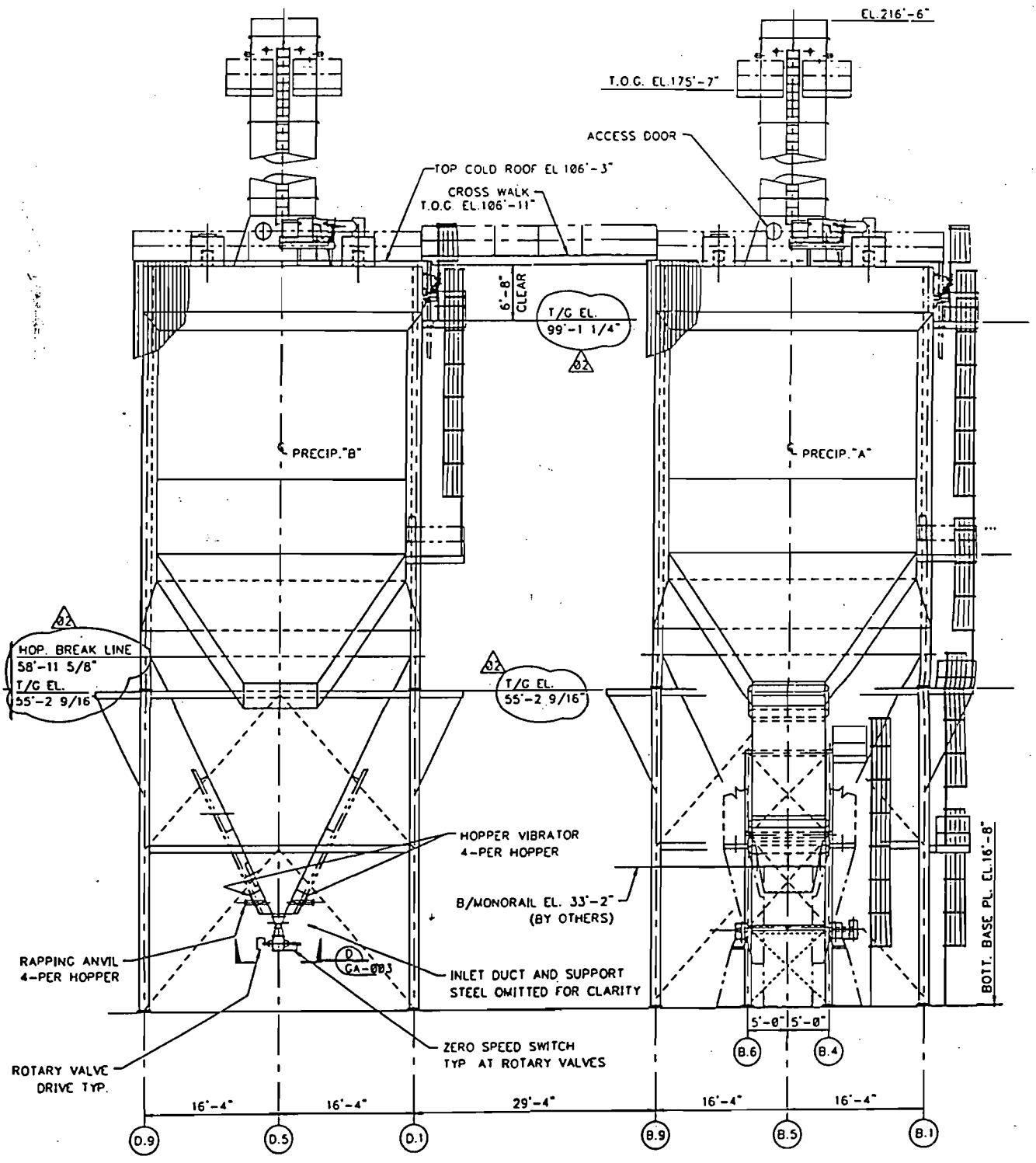
BEST AVAILABLE COPY






General Arrangement View of Boiler

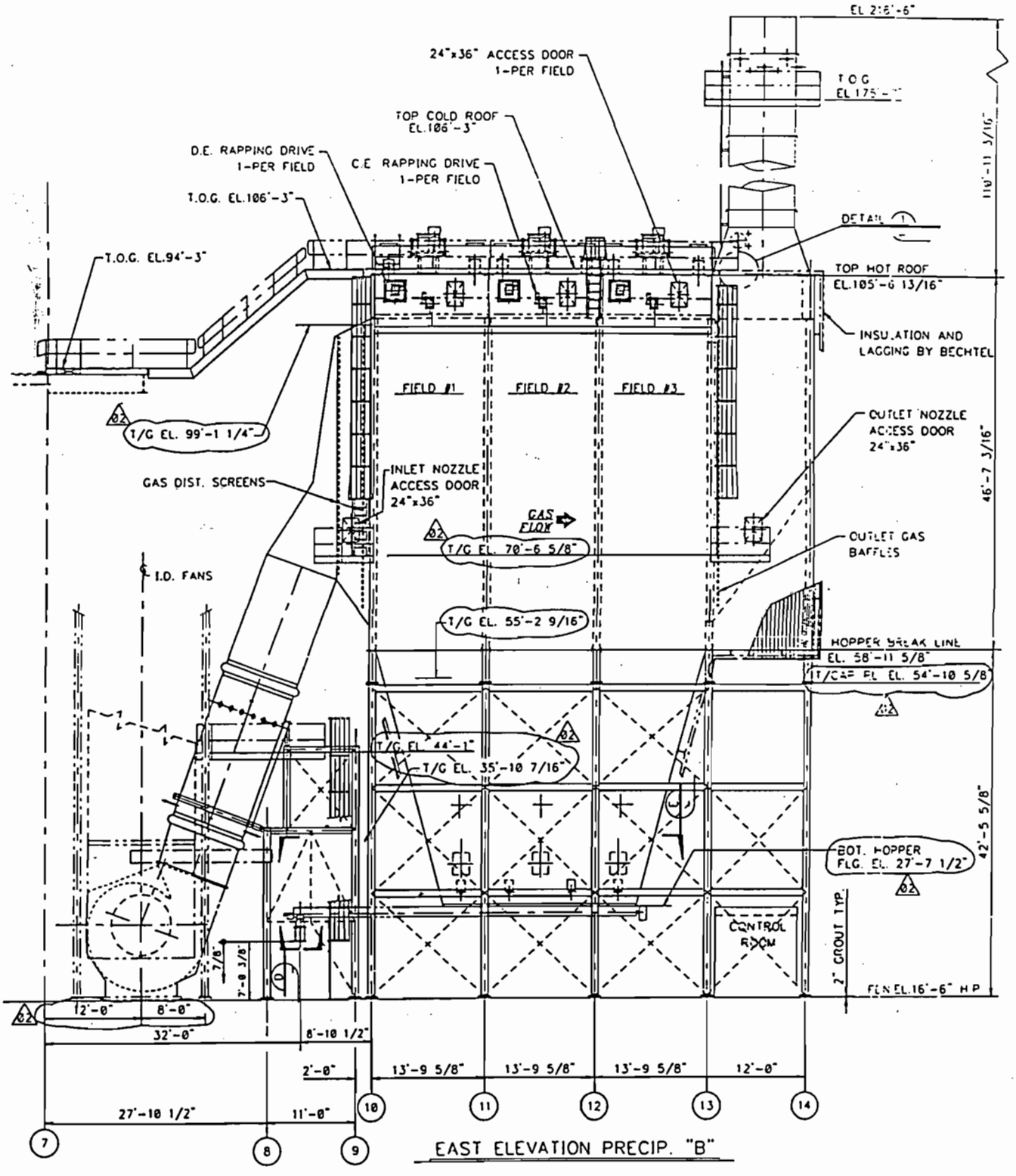
Source: ABB Environmental Systems, 1994.




SOUTH ELEVATION
(INLET)

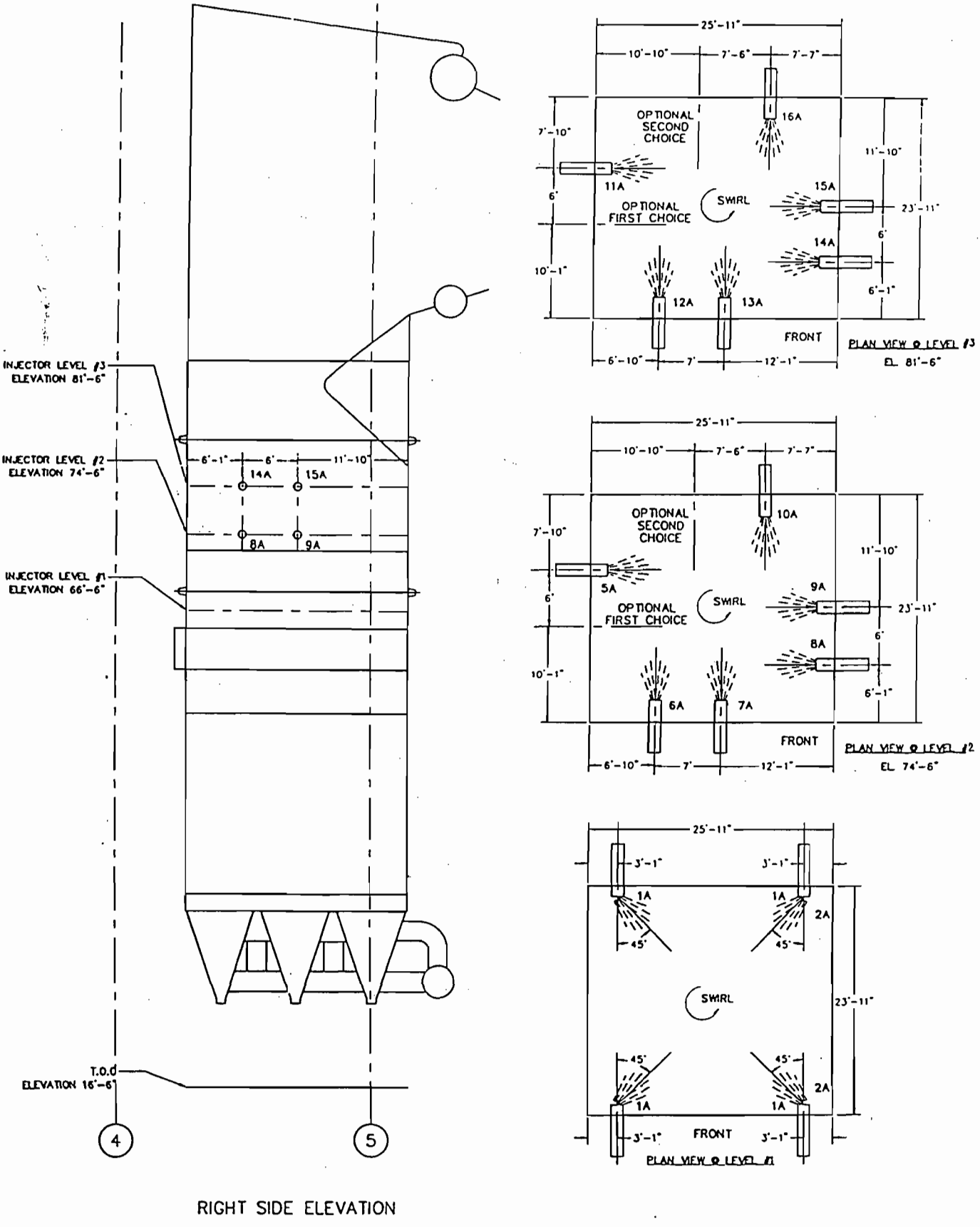
South Elevation of ESPs with Stack

Source: ABB Environmental Systems, 1994.



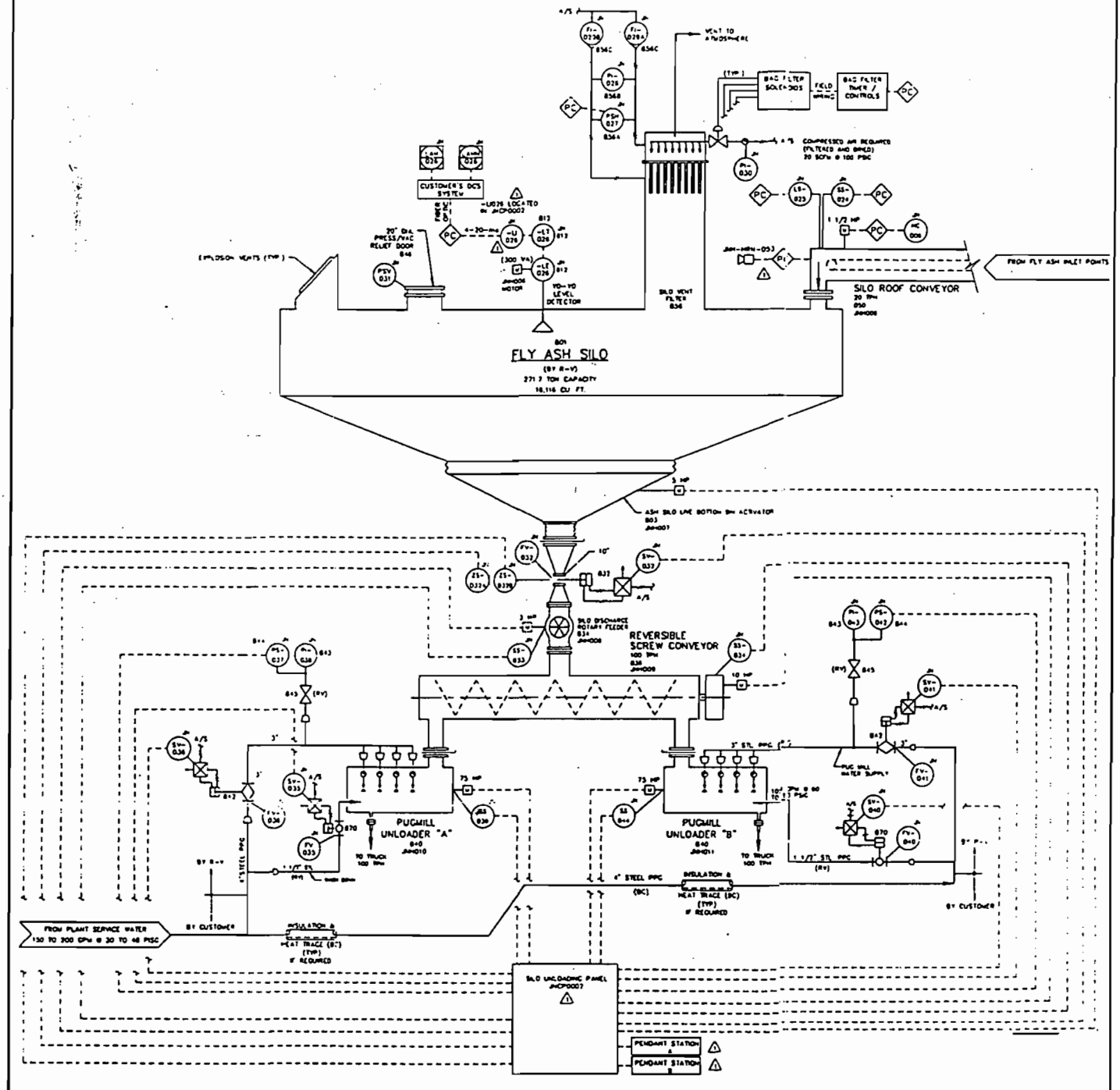

East Elevation of ESPs with Stack

Source: ABB Environmental Systems, 1994.




## Schematic of Urea Injection Points

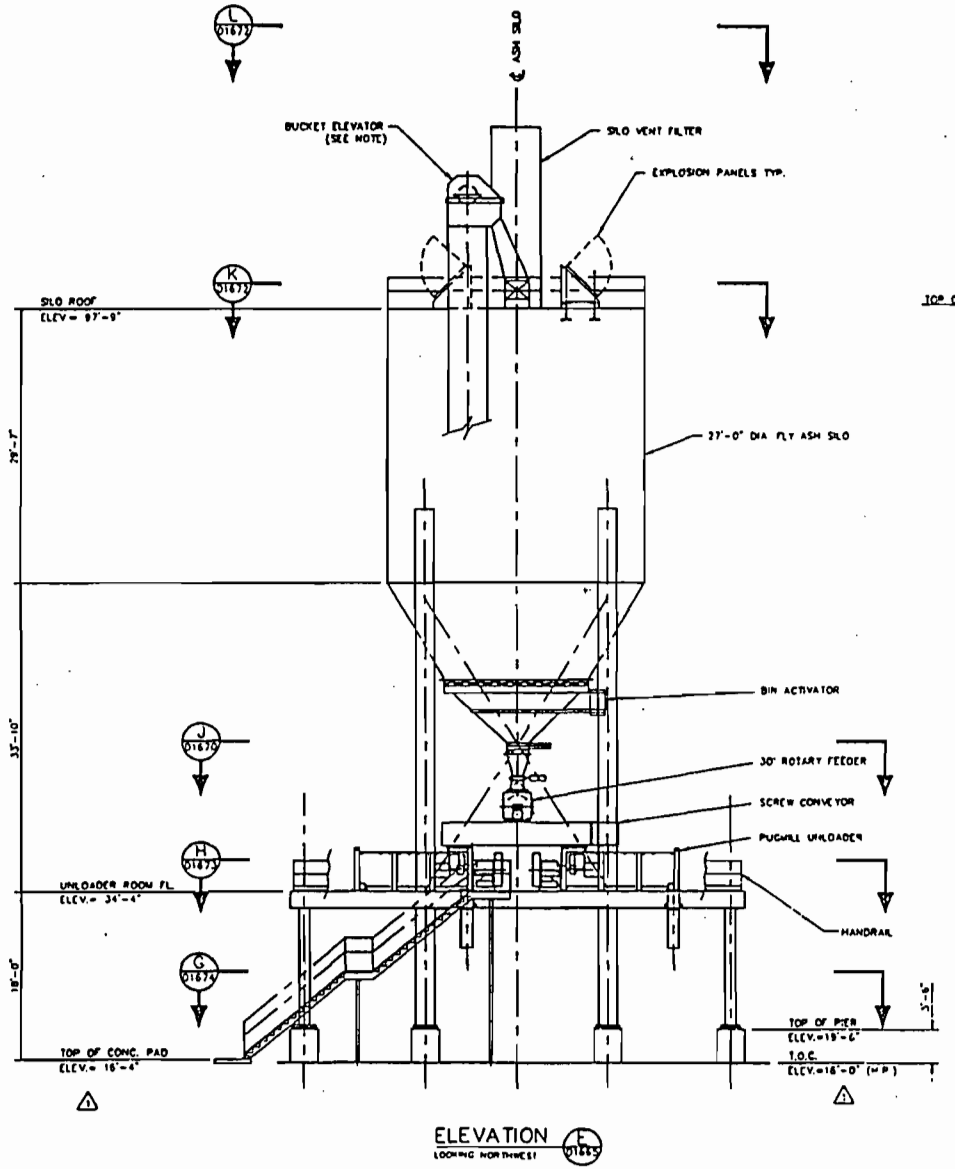
Source: Nalco FuelTech, 1994.



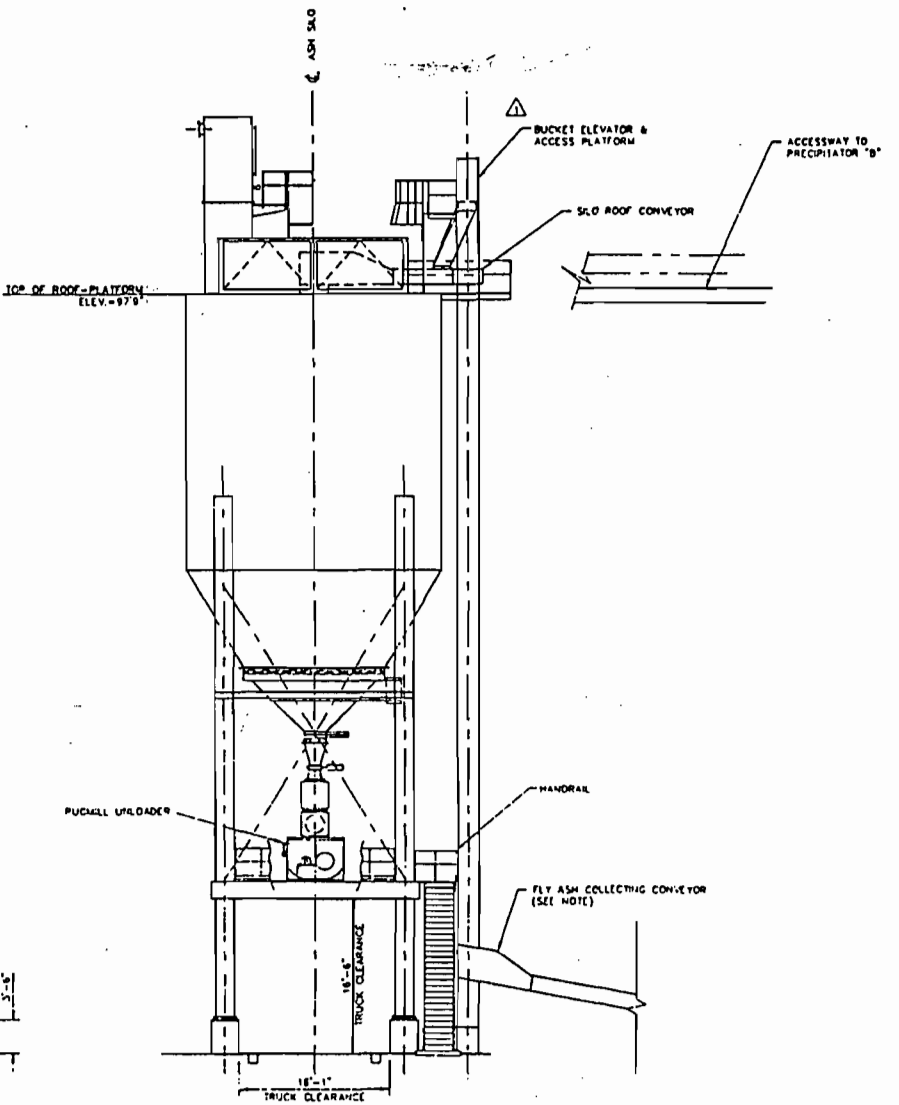

Fly Ash Silo

Source: RV Industries, Inc., 1994.

04-21-95




ELEVATION E 01665
LOOKING NORTHWEST




ELEVATION F 01666
LOOKING NORTHEAST

General Arrangement of Fly Ash System

Source: RV Industries, Inc., 1994.

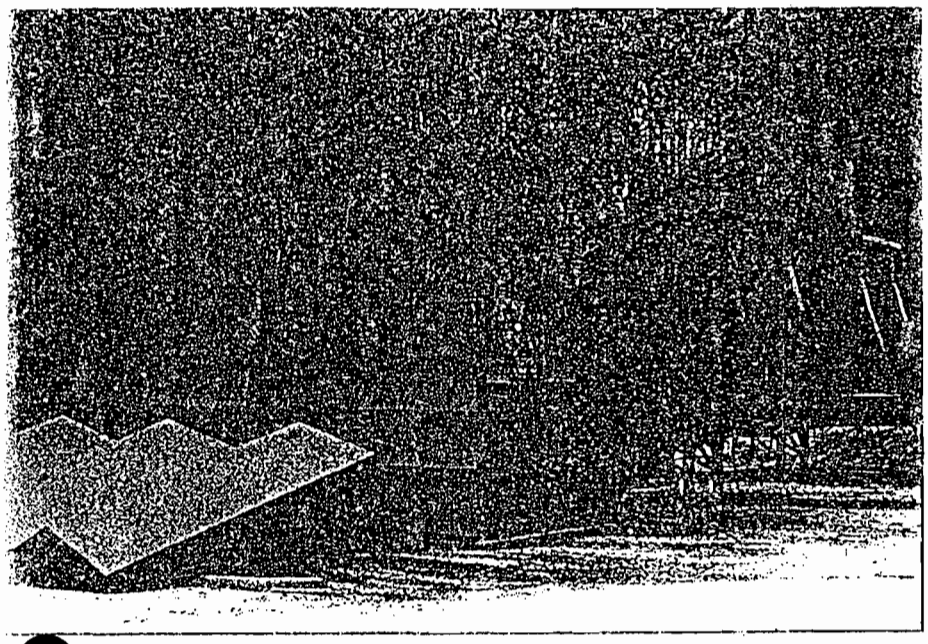
BEST AVAILABLE COPY

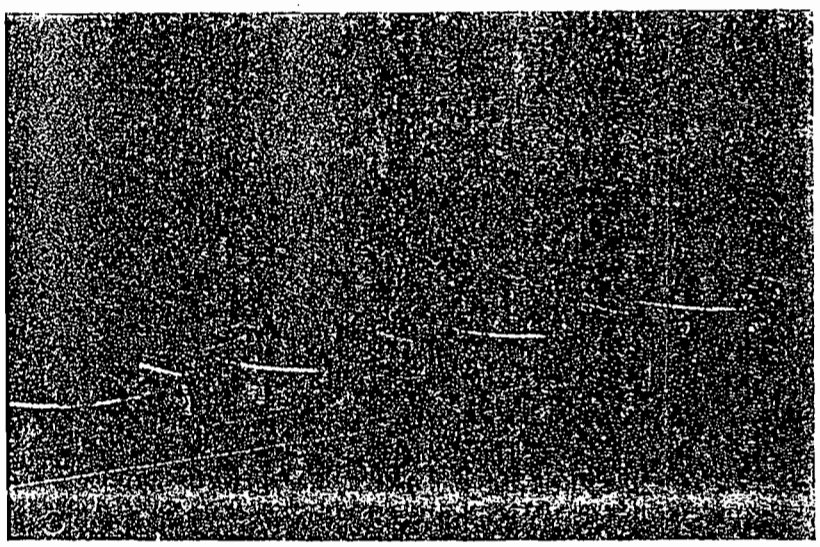
# BARRON INDUSTRIES

## DUST COLLECTORS

BEST AVAILABLE COPY

# THE BARRON INDUSTRIES COMMITMENT





A mechanical dust collector performs one of the most important jobs in your duct system. It must be engineered to protect other expensive machinery downstream from wear and abrasion, yet itself maintain integrity to insure years of proper service.

The selection of a dust collector and the judgement of proper construction is an important one. The wrong selection or judgement will ultimately leave the user with a series of maintenance and system problems. For this reason it is our philosophy to provide a lasting, well functioning product. As with our other products this philosophy follows through...Keep it simple, keep it strong, don't compromise.

## DESIGN

Barron Industries offers mechanical dust collectors with three tube sizes (9", 14" and 24") and two arrangements for tube access. Operating temperatures to 800° F and grain loadings to 50 gr./ACF are regularly handled. Because the collector sections are modular our capability for capacity is virtually unlimited. Each collector is custom engineered to insure strength and integrity, operating performance and extended service life.

## DELIVERY

No one understands more than Barron Industries that... time is money. Our size, manufacturing procedures and engineering capabilities make it possible for us to meet even the most difficult turn around schedules.

## MANUFACTURING

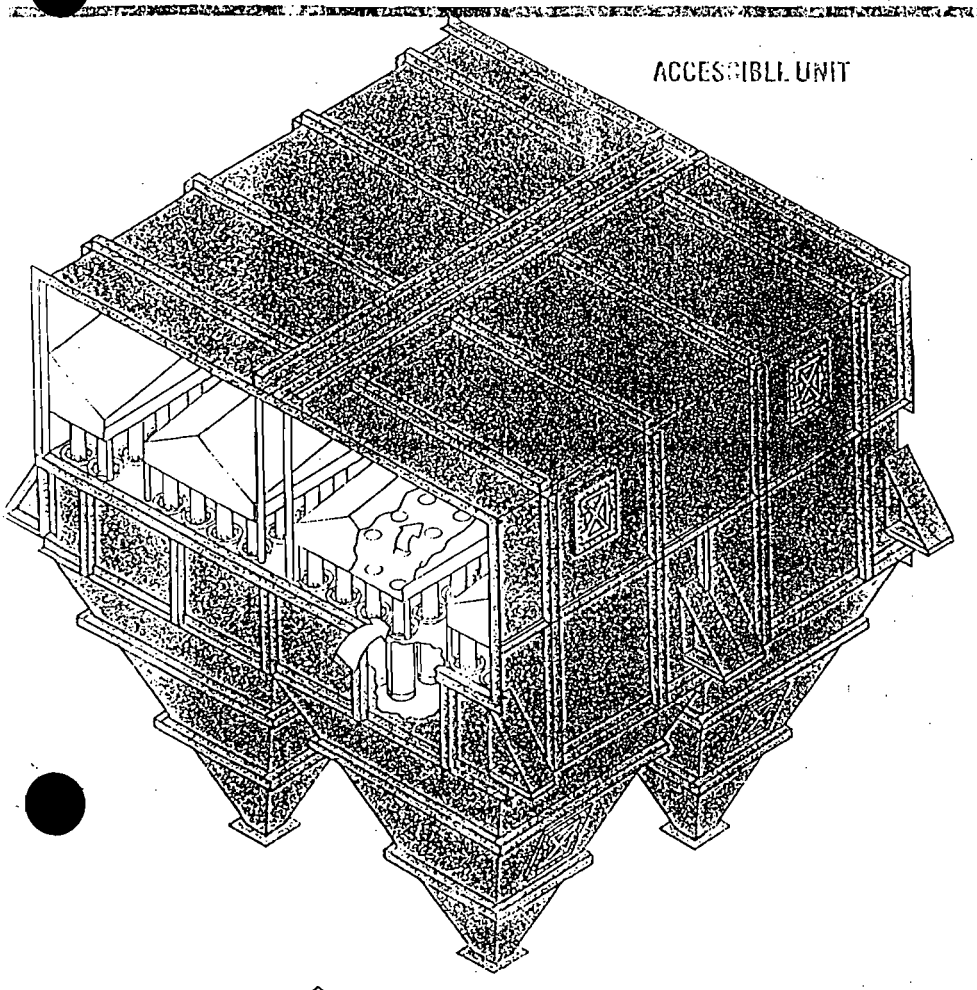
Our mechanical dust collectors are manufactured in Barron facilities where we have assembled, over many years, a skilled, experienced team of employees. In-house manufacturing assures you of quality products and timely performance on every job.

## INSTALLATION, START UP AND MAINTENANCE

Barron Industries is extremely proud of its field service. We have one of the largest, most experienced field service groups devoted to air control systems in the country. Barron Industries will engineer, manufacture, install and maintain your dust collector. We can provide true turn-key installation when your project demands unit responsibility.

BEST AVAILABLE COPY

# COLLECTOR TYPES




## MULTITUBE UNITS

Accessible Unit--Barron's "Accessible Unit" provides maximum visibility of internal components. Personnel can enter through alleyways between tube groupings for routine inspection or cleaning. This immediate access to any tube drastically reduces maintenance downtime and operating expense.

The Accessible Unit's lower inlet gas velocity and multiple tube arrangement combine to reduce inlet wear and increase efficiency through improved gas distribution.

Barron's Accessible Unit concept can be easily designed to fit your installation needs.

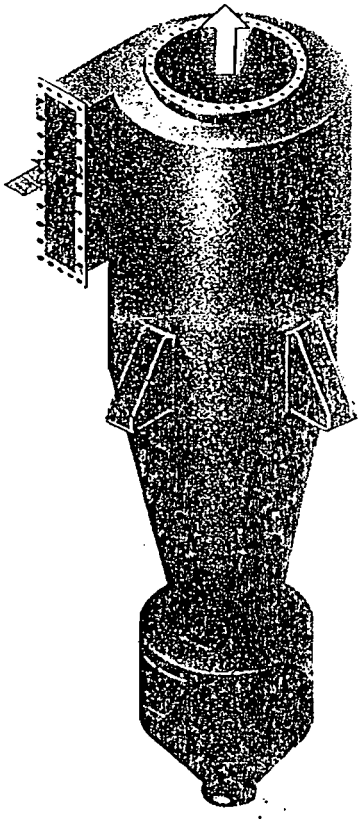
Limited Access Unit—This Unit is designed with a sloped outlet tube sheet and no alleyways and is commonly used for smaller gas volumes. Tube assemblies are identical to those in Accessible Units.

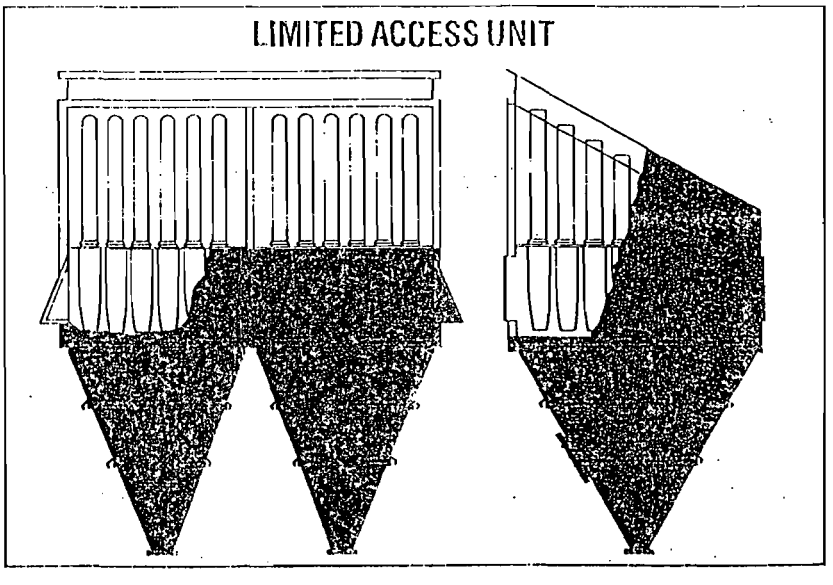
## LARGE DIAMETER CYCLONE

L D Cyclones are available as single units or in cluster arrangements.

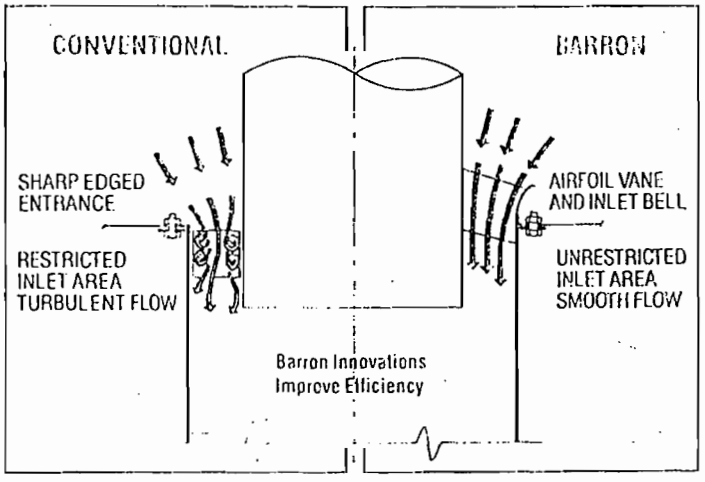
These units are primarily used for precleaning applications reducing the dust loading to downstream cleaning devices or process fans.

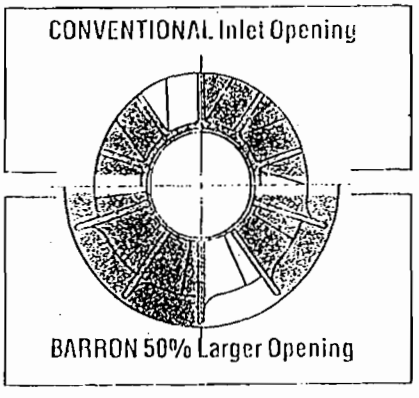
The L D Cyclone is a good choice for extremely heavy dust loadings and provides moderate efficiencies at minimal cost.



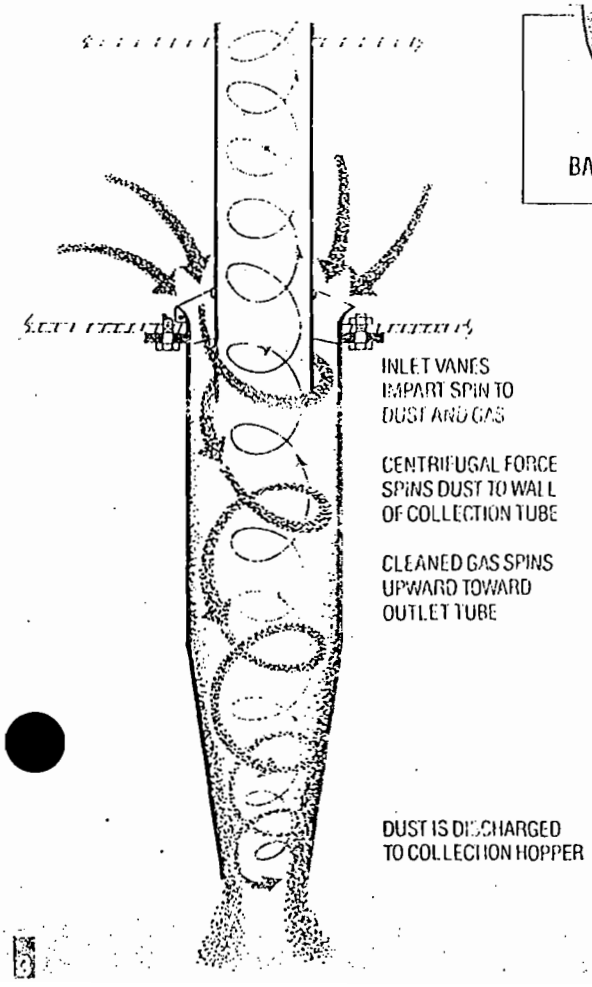


# EFFICIENCY




## PRINCIPLE OF OPERATION




### HIGHER EFFICIENCY

Conventional collector designs incorporate a "sharp-edged" gas inlet condition which creates turbulence in the inlet vane area. Barron's patented "inlet bell" smooths the gas flow virtually eliminating turbulence. Removing turbulence increases the energy available to impart centrifugal force to the dust particles. This improves collection efficiency for the same collector draft loss (pressure drop).

Inlet vanes with an airfoil cross-section also increase efficiency. Tests prove efficiency is increased using Barron engineered airfoil vanes. Most conventional collectors use "uniform thickness" inlet vanes.

### MINIMAL OPERATING COST

**Reduced Plugging**—In redesigning the inlet vane area, Barron lifted the vanes out of the restricted annular space between the inlet and outlet tubes. This resulted in 50 percent larger openings for gas and dust passage.

This innovation greatly reduces the tendency for plugging. Tube plugging will destroy collector efficiency. Barron's collectors keep you "online" with high efficiency.

**Removable Vanes**—The two piece inlet bell/vane assemblies on all Barron units are individually removable. Downtime cost is minimal since Barron components are easily serviced.

Investigate retrofitting with Barron inlet bells, vanes and tubes when your present equipment is not performing due to plugging or wear. These components are interchangeable with many competitive units.

Barron has provided complete collector internals for existing units improving performance without modifying the system.

### CALCULATING ACCURATE COLLECTOR EFFICIENCY

Process conditions of

1. *dust particle size and distribution*
2. *dust specific gravity*
3. *process gas temperature*
4. *collection tube diameter*
5. *dust collector pressure drop*

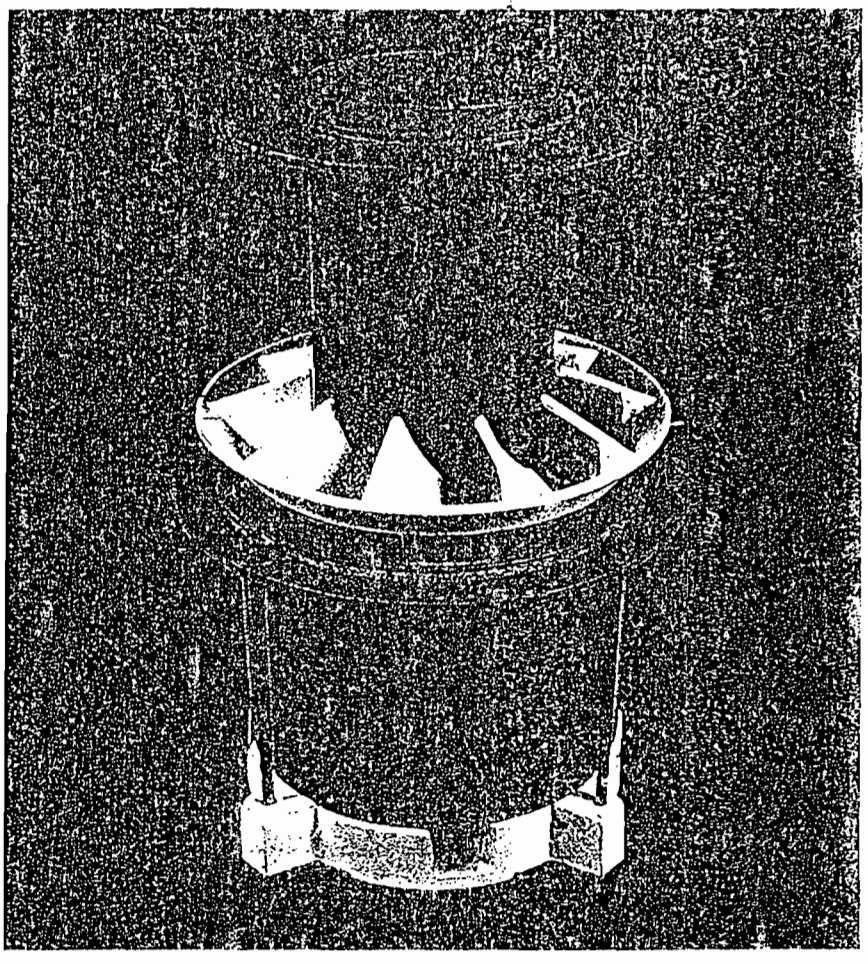
dictate the collection capability of any mechanical collector.

A specific system's overall efficiency can not be determined without inclusion of the above factors.

Call Barron with your process conditions as listed above and we will calculate accurate collector efficiency.

BEST AVAILABLE COPY

# TROUBLE-FREE PERFORMANCE



## LONGER LIFE

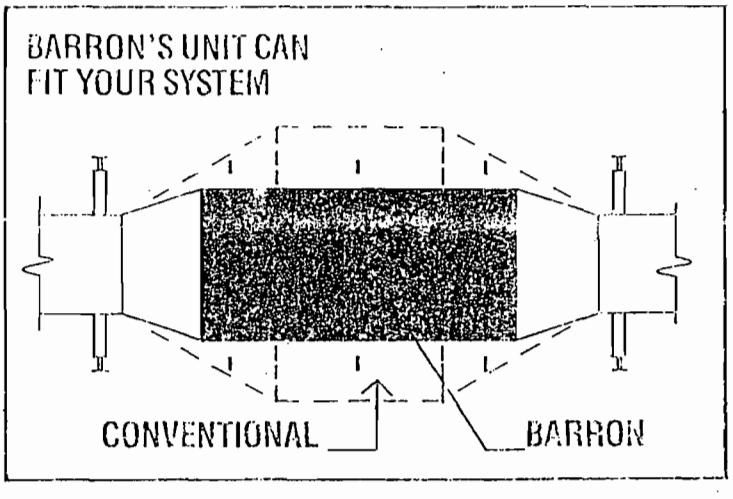
All Barron collectors are built for heavy duty service. Casing panels and hoppers are fabricated using one-quarter inch minimum thickness steel plate. Tube sheet thicknesses vary from one-quarter to three-eights inch. Inlet and outlet tubes are centrifugally cast, hard iron with wall thicknesses up to one-half inch thick. All critical wear parts are hard iron which is proven to outwear carbon steel.

If replacement is ever necessary, inlet and outlet tubes are bolted to tubesheets for easy removal. Inlet bells and vanes can be removed using standard hand tools. This reduces operating expense and insures longer life.

## COMPETITIVE PRICING

Barron's unique "Patented design" increases the volumetric capacity for a given collection tube as compared to conventional collectors at the same collector draft loss. This increase in capacity is achieved without incorporating outlet recovery vanes or similar troublesome components sensitive to plugging that are found on conventional collectors.

Barron collectors use fewer tubes for a specific design condition. Using fewer tubes allows Barron to incorporate Heavy Duty design features and still remain competitive. The economics of the Barron design are passed on to our customers in the form of improved performance and longer equipment life.



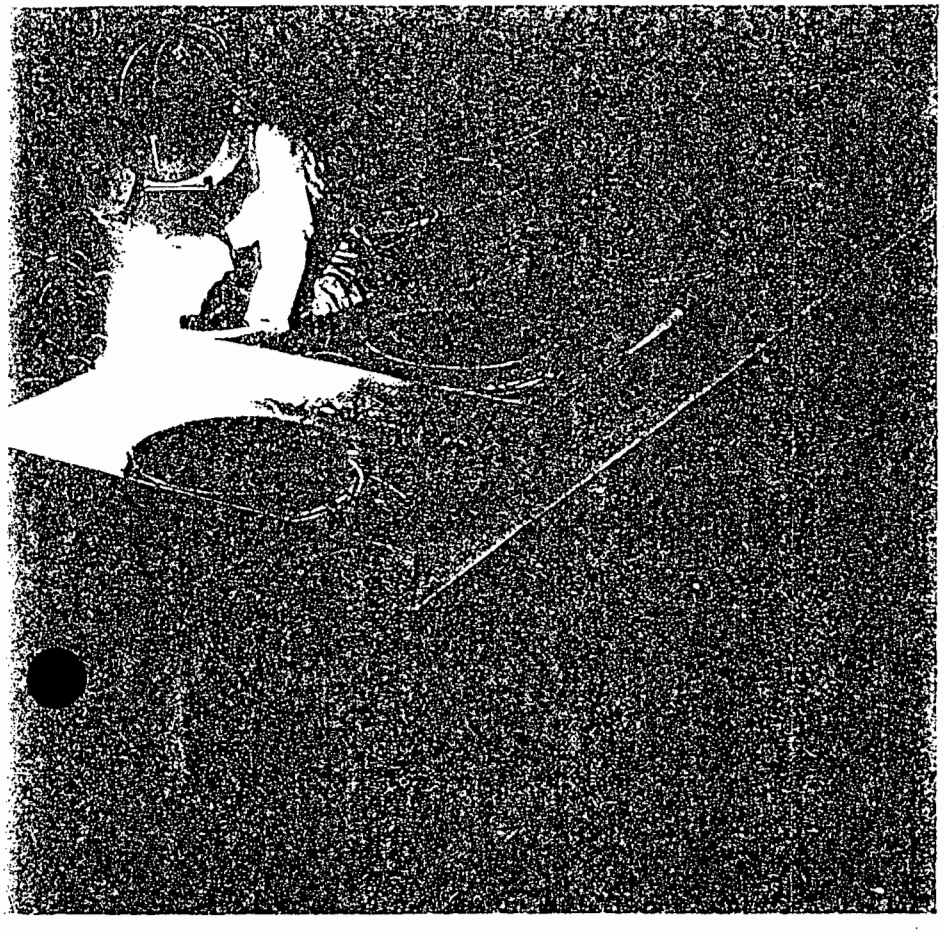

## INSTALLATION FLEXIBILITY

Barron will design a collector that meets your difficult space and installation limitations. This flexibility is possible due to lower inlet gas velocities and the "Accessible Unit" design concept.

Barron's collector depth can be increased without the loss of efficiency associated with conventional units. This illustration shows that the Barron "Accessible Unit" can more easily fit your ductwork reducing the need for costly duct transitions and turning vanes. In many cases, Barron's collectors need no duct transitions. Support steel is similar to the ductwork supports which simplifies your system design and fieldwork. The Collector Virtually Takes the Place of the Ductwork!

BEST AVAILABLE COPY

# REDUCES COST



Barron's "Accessible Unit" is a modular concept designed to minimize handling problems during shipping and installation. The basic module consists of a lower casing complete with all inlet and outlet tubes, tubesheets and structural support pads.

The side casing panels, roof panels, outlet plenums and hoppers are shipped separately and are welded easily into a unit during installation.

## EQUIPMENT SPECIFICATIONS

Barron's standard dust collectors are supplied with heavy duty components. Collection tube wall thickness and material hardness can be varied to fit particular process conditions.

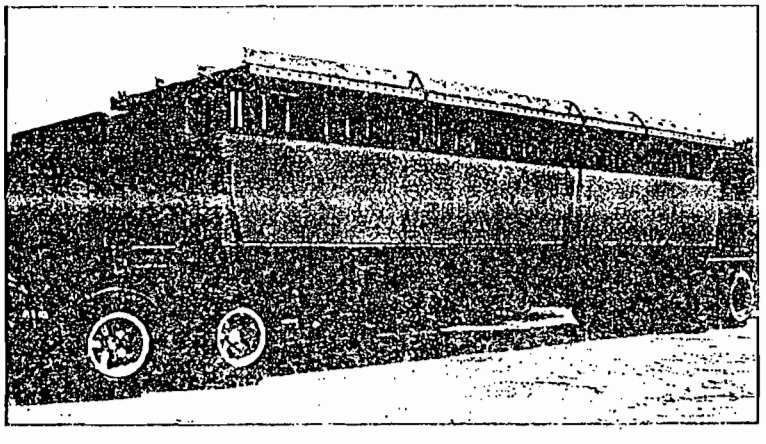
Collection tube sizes:
- 9" diameter; ¼" wall thickness (heavier in wear areas)
- 14" diameter; ⅜" wall thickness
- 24" diameter; ½" wall thickness

Tube Material:
- Centrifugally cast, hard gray iron

Casing and Hopper:
- ¼" carbon steel (minimum)

Tubesheets:
- ¼" to ⅜" carbon steel

Access Doors:
- 18" x 24" cast iron with quick release latches.
- Other size options
- 18" x 18"
- 24" x 30"

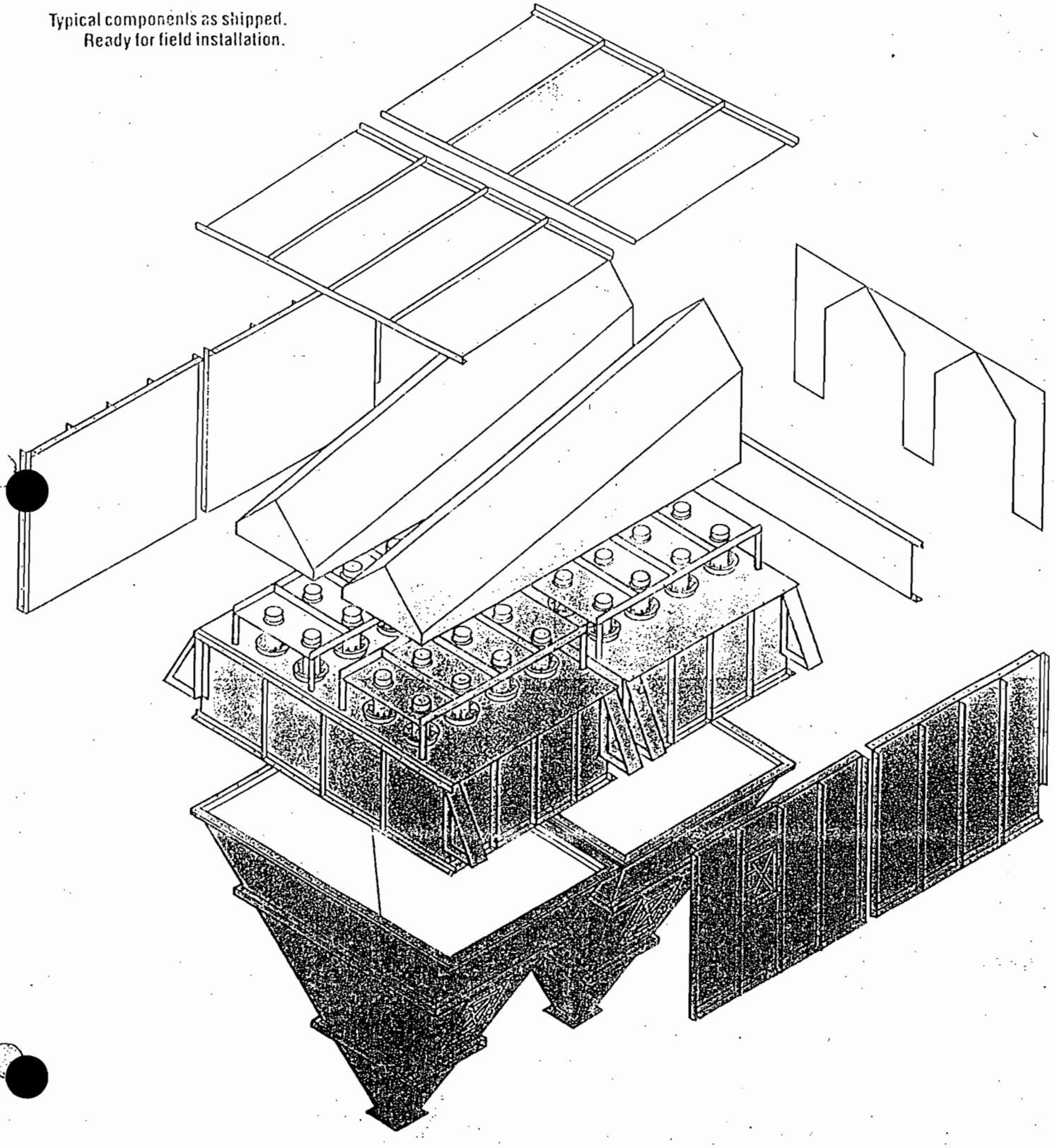


## ADVANTAGES

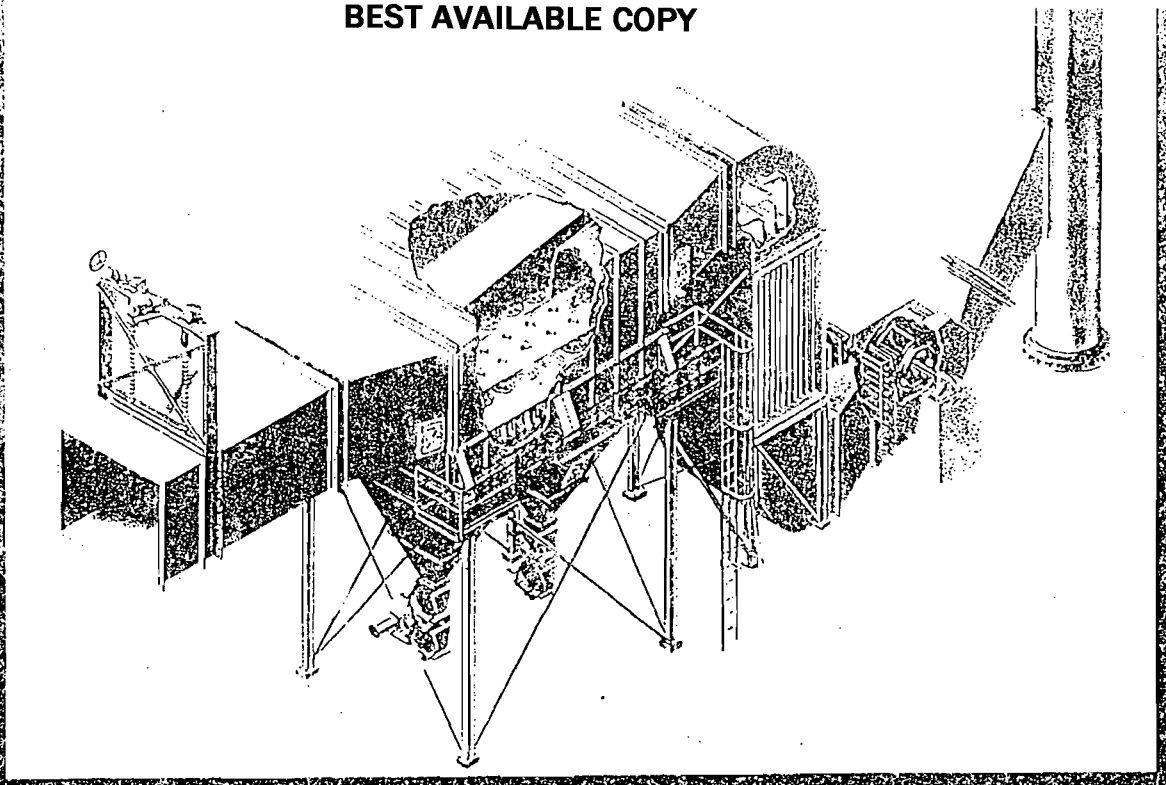
- Higher Efficiency
- Complete Access To Internals
- Reduced Plugging
- Reduced Downtime
- Flexibility and Ease of Installation
- Improved System Design

BEST AVAILABLE COPY

Typical components as shipped.
Ready for field installation.



BEST AVAILABLE COPY



We design, manufacture and install all types of expansion joints in any size. Single or multiple round top metal bellows and fabric joints are available.

Ruggedly designed for quick opening and light shut-off, Barron access doors in four standard sizes are in stock and ready for immediate shipment.

Flow control and isolation dampers are designed for specific applications. Rugged construction and experienced engineering result in a product that provides years of dependable, trouble free service.

Available in dual wall, multi-flue and single shell arrangements. We analyze requirements, design for particular applications including protective linings. Turn key installations available.

Our heavy duty construction insures minimal maintenance, while providing maximum collection efficiency. The unique bell-shaped inlet reduces unnecessary draft loss, saving energy. Tube sizes vary for dust characteristics. Modular construction reduces installation costs.

Barron designs, furnishes and installs radial blade, radial tip, backward inclined, airfoil and specialty fans, designed for the most severe applications.

Double and single dust valves for bins and hoppers cast in 8", 10" and 12" sizes, operated electrically or pneumatically.

Barron offers regularly scheduled vibration inspection and analysis to prevent problems. On-site balancing is available with the latest dynamic balancing equipment for wheels to 360".

All rotating equipment can suffer the destructive forces of vibration. Barron on-site analysis of rotating machinery results in a computerized projection of performance and possible failures that will facilitate scheduling repair.

Barron field crews are experts in the installation of all types of gas/air systems. On-site machining is available for shafts and journals.

Barron has earned the reputation as "America's Emergency Wheel Repairer." Three day repair is available. Barron offers on-site wheel removal, repair and installation which avoids excessive down time.

Call Barron Industries Anytime. 205/699-2191

BARRON INDUSTRIES

(205) 699-2191
TELECOPY (205) 956-2265
MAIL: PO BOX 570, LEEDS, ALABAMA 35094-0056
COURIER: 105 19TH STREET SOUTH, BIRMINGHAM, ALABAMA 35210-1526

BEST AVAILABLE COPY

FLORIDA CRYSTALS CORPORATION

Mechanical Collector Efficiency

BASE III tube dia. = 9.00 in.

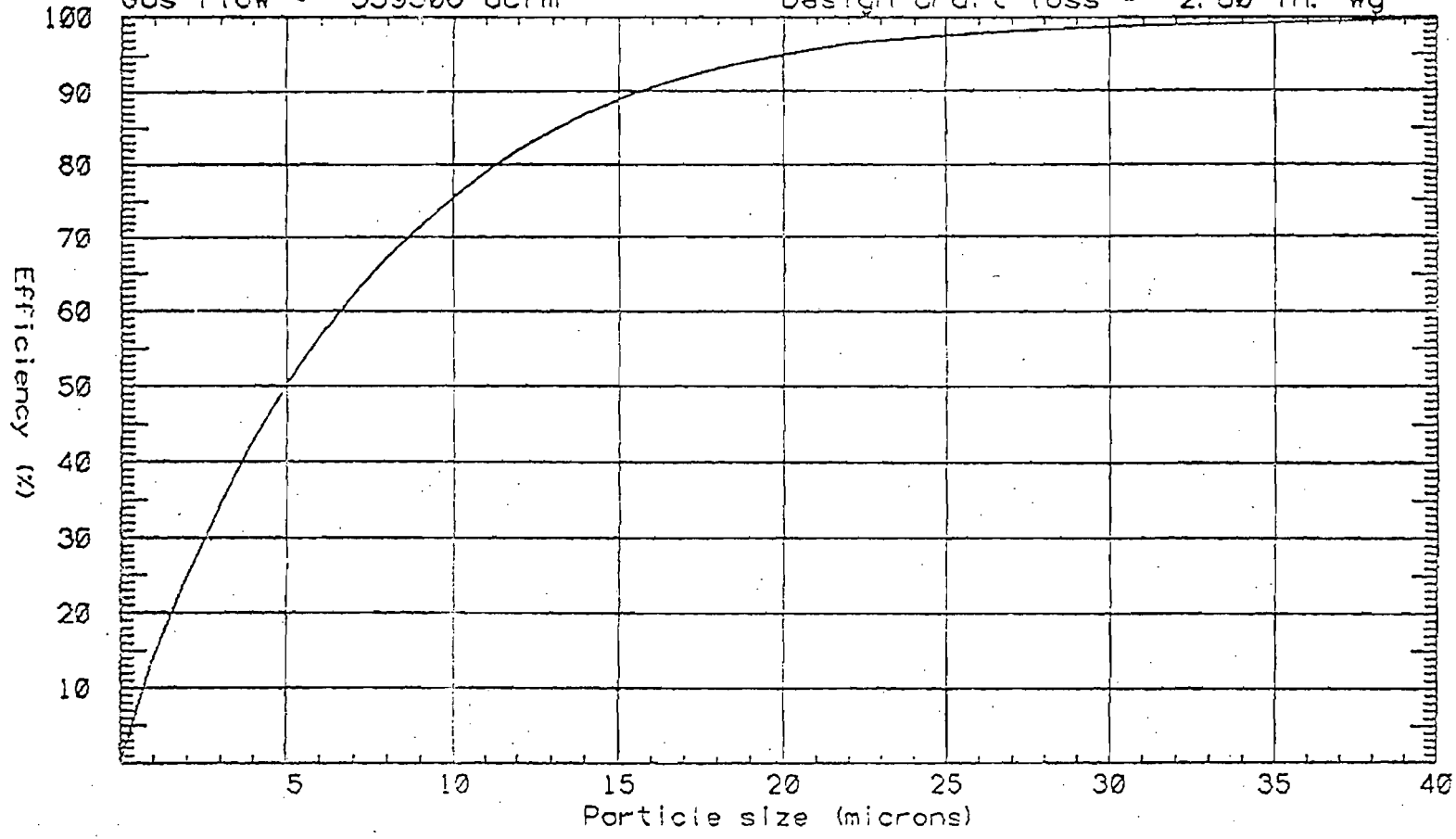
Number of tubes = 460

Gas flow = 359506 acfm

Gas temperature = 450 deg. F

Specific gravity of dust = 1.00

Design draft loss = 2.80 in. wg




Created by program DUST at 10:48 AM Wed. 19 May. 1999

1.090

BEST AVAILABLE COPY

FLORIDA CRYSTALS CORPORATION

Mechanical Collector Efficiency

BASE III tube dia. = 9.00 in.

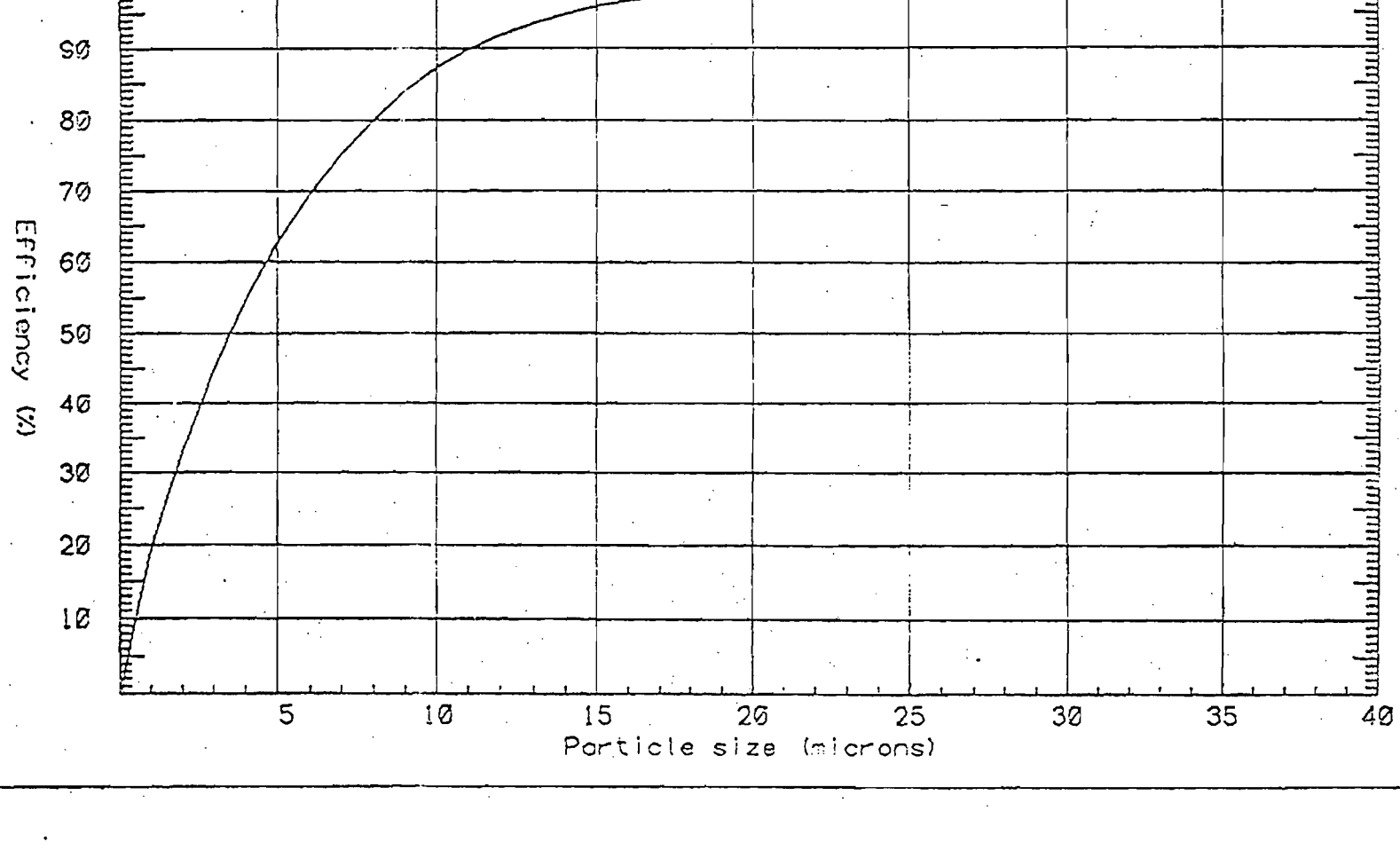
Number of tubes = 460

Gas flow = 359506 acfm

Gas temperature = 450 deg. F

Specific gravity of dust = 2.00

Design draft loss = 2.80 in. wg




Created by program DUST at 10:50 AM Wed., 19 May, 1999

1.000

# APPENDIX B

# FUEL INSPECTION PLAN, PALM BEACH POWER CORP.

# Wood Fuel
# Inspection Plan

# Palm Beach Power Corporation

Prepared by

Palm Beach Power Corporation
Osceola Cogeneration Plant
U.S. Hwy. 98 & Hatton Highway
Pahokee, FL 33476

Submitted to
Florida Department of Environmental Protection
Bureau of Air Regulation
March 2002

## TABLE OF CONTENTS


| | | |
|---|---|---|
| 1.0 | INTRODUCTION | 2 |
| 2.0 | FACILITY INFORMATION | 2 |
| 3.0 | PROCESS DESCRIPTIONS | 3 |
| | 3.1 Wood fuel Handling System | 3 |
| 4.0 | INSPECTION PROCEDURES | 3 |
| | 4.1 Wood fuel Supply Sites | 3 |
| | 4.2 PBPC Wood Yard Storage | 4 |
| 5.0 | RECORDKEEPING | 5 |


Reference:

Bechtel Drawing 22433-M-03 1-01440-02; "Fuel Handling System Flow Diagram"

## 1.0 INTRODUCTION

Palm Beach Power Corporation (PBPC) is proposing to construct a bagasse/wood-fired cogeneration plant, known as the Osceola Cogeneration Plant, adjacent to the site of the Osceola Farms sugar Mill. The PBPC site is located approximately six miles east of the town of Pahokee, at the intersection of U. S. Highway 98 and Hatton Highway, in Palm Beach County, Florida.

PBPC is proposing to implement inspection procedures for the wood fuel and other materials delivered to the plant for fuel. The primary function of these procedures is to keep painted and chemically-treated wood, household garbage, toxic or hazardous non-biomass, and non-combustible waste material from being burned at the plant. This Wood Fuel Inspection Plan describes the implementation of these procedures during operation of the PBPC facility.

The plan includes a brief description of the PBPC facility and its operations related to wood fuel (Sections 2.0 and 3.0). Procedures for inspection of the wood fuel at both the wood fuel supply sites and at the PBPC facility are described in Section 4.0. The procedures PBPC will implement for recordkeeping of inspections are provided in Section 5.0.

## 2.0 FACILITY INFORMATION

The PBPC plant will be a new 74 MW (net) bagasse and wood-fired cogeneration plant located in Pahokee, Florida, adjacent to the existing Osceola Farms sugar mill. The plant will be designed to supply high and low pressure steam to the Osceola Farms sugar mill during the grinding season (mid-October to April). During the non-grinding season, the PBPC facility will generate electrical power for sale to the power grid, with no steam to the sugar mill. Throughout the year, the facility will utilize a mixture of bagasse and wood fuel, since this enhances overall combustion. Steam generation will be accomplished by means of modern spreader stoker type boilers. Electrical power generation will be provided by means of an extraction-condensing steam turbine generator set which will provide electricity

to meet in-house loads and for sale to the power grid. The major components of the plant include:

- two balanced draft bagasse/wood-fired boilers with membrane wall construction, superheater, and economizer (boilers will also be permitted for No. 2 fuel oil and natural gas for startup and supplemental fuel).
- two mechanical collectors (one per boiler) and two electrostatic precipitators (one per boiler) with integral stacks
- an extraction-condensing steam turbine generator set
- material storage and handling systems (e.g., wood, bagasse, ash) ancillary plant equipment

## 3.0 PROCESS DESCRIPTIONS

The following sub-sections describe the PBPC wood fuel system from a "process flow" standpoint. Although the PBPC facility will also include a bagasse handling system, which operates during the sugar cane grinding season, only the wood fuel will be subject to the inspection program. Therefore, only the wood fuel system is described in this plan.

### *3.1 Wood Fuel Handling System*

The following description of the Wood Fuel Handling System is depicted schematically on the wood/bagasse flow diagram contained in the application.

Wood fuel will be delivered to the PBPC facility by net 25-ton trucks (typical) at an approximate design rate of 1,200 tons per day, with deliveries anticipated 12 hours per day, 6 days per week. The trucks will be unloaded utilizing two hydraulically operated, tipping floor truck dumpers.

Upon unloading, the wood fuel will be discharged into receiving hoppers equipped with live bottom chain conveyors, which will transfer the wood material onto a Truck Unloading Conveyor. The Unloading Conveyor, which is equipped with a belt scale and magnetic separator, will convey the wood fuel to the Hog Tower at a design rate of up to 200 tons per hour (TPH).

The Hog Tower is an open facility consisting of a disc screen and a motor-driven, size-reducing hog. The wood fuel will be discharged onto the disc screen, which acts to separate material sized less than 3" from any oversized material. The oversized material (i.e., >3") is discharged to the Hog, which reduces the wood pieces to the less than 3" size, suitable for feeding into the boilers.

The sized wood fuel will be transferred from the Hog Tower via the Storage Conveyor to the Radial Stacker Conveyor, which deposits the sized wood fuel at the wood storage area.

Sized wood fuel will be reclaimed from the wood pile at a design rate of up to 125 TPH through the use of two under-pile chain reclaimers. The reclaimers will transfer the sized wood fuel to the Boiler Feed Conveyor, which deposits the fuel on to one of two chain distribution conveyors for apportionment into the boilers.

## 4.0 INSPECTION PROCEDURES

The specific inspection procedures to be utilized at each stage of the wood fuel system is provided in the following sub-sections.

### *4.1 Wood fuel Supply Sites.*

As stipulated in the PBPC fuel supply contracts, the delivered wood fuel must be substantially free of plastics, rubber, glass, and painted wood and contain only incidental amounts of chemically treated wood (e.g., chromium, copper, arsenic, creosote, pentachlorophenol). The wood fuel will be supplied to PBPC

under long-term and short-term contracts in accordance with the fuel quality specifications.

The wood fuel specification imposed on the suppliers will be as follows:

1. only clean woody material derived from yard waste, landscape maintenance, land clearing operations, and shrub and tree trimmings and may include tree stumps, clean construction/demolition debris, and similar clean wood derivatives. It shall not include grass, leaves or residual of palm.
2. free from chemically treated wood (e.g. chromium, copper and arsenic; creosote; or pentachlorophenol) except for incidental amounts, not to exceed 1% by weight.
3. less than 5% dry ash.
4. moisture content shall be less than 37%.
5. no trash, garbage, sludge, hazardous waste, municipal waste, biohazardous waste, biological waste or medical waste.
6. less than .5% by volume or weight on an as received basis of plastics, rubber, glass, paper or painted wood.
7. adequate separation shall have been used prior to delivery to remove foreign material including, but not limited to, metal, rock, concrete, soil, paper, petroleum products or other impurities.

PBPC will have the right to reject any load which does not meet any one of the above requirements, and the supplier will be required to remove the delivered amount from the site.

To help ensure that wood fuel delivered to PBPC meets the fuel quality requirements, the wood fuel suppliers will perform inspection and material segregation operations on the feedstock received at their facilities. Although PBPC will obtain wood fuel from several different suppliers with a variety of sources, the following description of the inspection and material segregation operations are typical of those operations performed at wood yards which will supply PBPC.

The bulk material feedstock at the originating wood yards will first undergo a "gross" material separation by removing the bulk wood fuel from other mixed materials (e.g., plastics, non-wood debris, scrap metal, concrete/soils) through the use of heavy equipment, magnetic separation, and mechanical screening. Trained personnel will be involved in oversight at this level of material segregation such that the majority of prohibited materials are removed from the bulk wood fuel. After this operation, the wood fuel will be further visually inspected and manually sorted (when applicable) to remove chemically-treated and painted wood, smaller mixed wastes and other non-combustible materials. The "sorted" wood fuel will then be mechanically sized and screened (to actual contract specifications) prior to delivery to the PBPC site.

As a quality assurance measure, each fuel supplier's operations will be reviewed periodically to ensure that the supplier's inspection and segregation efforts remain at acceptable levels.

### *4.2 PBPC Wood Yard Storage*

Upon delivery of the wood fuel to the PBPC, each load will be visually inspected by the Fuel/Ash Handler stationed at the truck receiving dumping area. Loads which contain unacceptable, visible amounts (i.e., greater than fuel contract specified limits) of chemically treated and/or painted wood and other prohibited mixed wastes will be rejected by the inspector and prevented from discharging at the

PBPC fuel storage area. If the delivered load is acceptable based on the visual inspection, the truck will be staged for unloading.

## 5.0 RECORDKEEPING

Records of wood fuel inspections will be maintained at the PBPC facility. The records will typically include:

- Fuel delivery information (e.g., supplier, time/date of delivery, type of material, delivery size).
- Any written inspection reports of wood fuel supplier operations.
- The ultimate disposal of any out of specification material.

# APPENDIX C

# BASIS OF FUGITIVE EMISSIONS FROM PBPC MATERIAL HANDLING SYSTEM

Table C-1. Estimation of Emission Factors and Rates For Vehicle Traffic on Unpaved Roads Palm Beach Power Corp.

| *General Data* | Pile Maintenance Front-end Loader |
|---|---|
| **Vehicle Data** | |
| Description | Biomass |
| Vehicle weight (W), tons- Loaded | 27 |
| - Unloaded | 9 |
| - Average | 18 |
| Vehicle miles traveled (VMT)- Annual | 21,900 [a] |
| Speed (S), mph | 5 |
| **General/ Site Characteristics** | |
| Days of precipitation greater than or equal to 0.01 inch (p)- Annual | 120 |
| Silt content (s), % | 5 |
| Moisture Content Under Dry Conditions ($M_{dry}$), % | 5.0 |
| Particle size multiplier, PM (k), lb/VMT | 10 |
| Particle size multiplier, $PM_{10}$ (k), lb/VMT | 2.6 |
| **Emission Control Data** | |
| Emission control method | Watering |
| Emission control removal efficiency, % | 50 |
| ***Calculated PM Emission Factor (EF)*** | |
| Uncontrolled EF, lb/VMT - Annual | 0.75 |
| Controlled (Final) EF,lb/VMT- Annual | 0.38 |
| ***Calculated $PM_{10}$ Emission Factor (EF)*** | |
| Uncontrolled EF, lb/VMT - Annual | 0.23 |
| Controlled (Final) EF,lb/VMT- Annual | 0.11 |
| ***Estimated Emission Rate (ER)*** | |
| PM ER, lb/hr | 1.88 |
| TPY | 4.110 |
| $PM_{10}$ ER, lb/hr | 0.56 |
| TPY | 1.233 |

***Emission Factor (EF) Equations***

Uncontrolled EF (UEF) Equation:

$$UEF(lb/VMT) = [(k \times (s/12)^a \times (W/3)^b)/(M_{dry}/0.2)^c] \times [(365-p)/365)] \times [S/15]$$

Where constants a, b, c equal:

| | PM | $PM_{10}$ |
|---|---|---|
| a | 0.8 | 0.8 |
| b | 0.5 | 0.4 |
| c | 0.4 | 0.3 |

Controlled (Final) EF (CEF) Equation:

CEF(lb/VMT) = UEF (lb/ton) x (100 - Removal efficiency (%))

[a] Based on vehicle operating 12 hrs/day, 365 days/yr at 5 mph.

Source: AP-42, Section 13.2.2, Unpaved Roads; September, 1998.

Table C-2. Estimation of Biomass Fuel Usage, Palm Beach Power Corporation

| Unit | Actual 1999 and 2000[a] Usage for New Hope Power Partnership (Okeelanta Cogen) | | | | | |
|---|---|---|---|---|---|---|
| | Woodwaste | | Bagasse | | TOTAL | |
| | Tons | MMBtu | Tons | MMBtu | Tons | MMBtu |
| Boiler A | 193,562 | 1,749,427 | 277,682 | 1,999,310 | 471,244 | 3,748,737 |
| Boiler B | 188,786 | 1,755,710 | 258,337 | 1,860,026 | 447,123 | 3,615,736 |
| Boiler C | 204,465 | 1,901,525 | 282,382 | 2,033,150 | 486,847 | 3,934,675 |
| TOTAL | 586,813 | 5,406,662 | 818,401 | 5,892,486 | 1,405,214 | 11,299,148 |
| AVG Btu/lb | 4,500 | | 3,600 | | | |

Percent Heating Value from Wood = 47.9
Percent Heating Value from Bagasse = 52.1

Palm Beach Power Corporation = $13.32 \times 10^{12}$ Btu/yr
Estimated Heat Input Due to Wood= $6.37 \times 10^{12}$ Btu/yr
Estimated Heat Input Due to Bagasse= $6.95 \times 10^{12}$ Btu/yr

| | |
|---|---|
| Wood Usage (TPY) = | 708,183 |
| Bagasse Usage (TPY) = | 964,772 |
| Total Usage (TPY) = | 1,672,955 |
| Total Usage + 50% (TPY) = | 2,509,432 |

fly ash = [(0.09 x 708,183) + (0.01 x 964,772)] x 0.20
= 14,677 TPY

[a] Represents maximum of either 1999 or 2000 data.

BEST AVAILABLE COPY

Spreadsheet as of 11:57:11 on 03-28-1995

Filename: bagpile.epc
..ventory area: Osceola Power L.P.
Source ID: Bagpile Filename: A:\Bagpile.EPC

Emissions estimate year: 94
Based on wind data year: 94
Fastest mile filename: westp94.met
System of units: English
Source life (inclusive days of year)
Start day: 1
End day: 365
F=flat area, PC=conical pile, PO=oval pile: PC
Pile height ( ft) :30
Pile diameter ( ft) :566
Area (sq ft): 252888.5
Material description: Bagasse/WW
Percent moisture content: 37
Percent silt content: 2.2
Threshold friction velocity, U*t, (cm/sec): 112
Roughness height (cm): 0.3
Mode (mm) of size distribution 3.533677# (# denotes calculated value)
.c value (cf. Fig. 6-3 of reference manual):

Frequency of disturbance information :
= .9 -- subarea # 1 -- 20 % of regime disturbed every 1 day(s)
/Ur = .6 -- subarea # 1 -- 20 % of regime disturbed every 1 day(s)
Us/Ur = .2 -- subarea # 1 -- 20 % of regime disturbed every 1 day(s)

otal emissions emitted over the period: 79243.23 g

hreshold velocity = 112 cm/s
ontrol: Effective windspeed ratio = 1

---
s/Ur = .9 Disturbance interval = 1 days

| | | | | | | |
|---|---|---|---|---|---|---|
| :riod | 9 - 10 | high on | 10 | 1.2069 | m/s | 735.9493 g emitted |
| :riod | 10 - 11 | high on | 10 | 1.2069 | m/s | 735.9493 g emitted |
| :riod | 15 - 16 | high on | 16 | 1.12644 | m/s | 46.0676 g emitted |
| :riod | 16 - 17 | high on | 16 | 1.12644 | m/s | 46.0676 g emitted |
| :riod | 33 - 34 | high on | 34 | 1.16667 | m/s | 364.5446 g emitted |
| :riod | 34 - 35 | high on | 34 | 1.16667 | m/s | 364.5446 g emitted |
| :riod | 44 - 45 | high on | 45 | 1.32759 | m/s | 2167.734 g emitted |
| :riod | 45 - 46 | high on | 46 | 1.40805 | m/s | 3386.895 g emitted |
| :riod | 46 - 47 | high on | 46 | 1.40805 | m/s | 3386.895 g emitted |
| :ri | 61 - 62 | high on | 62 | 1.85058 | m/s | 13876.62 g emitted |
| -iod | 62 - 63 | high on | 62 | 1.85058 | m/s | 13876.62 g emitted |
| od | 67 - 68 | high on | 68 | 1.24713 | m/s | 1160.283 g emitted |
| :riod | 68 - 69 | high on | 68 | 1.24713 | m/s | 1160.283 g emitted |
| :riod | 76 - 77 | high on | 77 | 1.16667 | m/s | 364.5446 g emitted |
| :riod | 77 - 78 | high on | 77 | 1.16667 | m/s | 364.5446 g emitted |
| riod | 87 - 88 | high on | 88 | 1.12644 | m/s | 46.0676 g emitted |

BEST AVAILABLE COPY

```
Period  88 - 89  high on  88   1.12644  m/s  46.0676  g emitted
Period  92 - 93  high on  93   1.24713  m/s  1160.283  g emitted
Period  93 - 94  high on  93   1.24713  m/s  1160.283  g emitted
Period  94 - 95  high on  94   1.16667  m/s  364.5446  g emitted
Period  139 - 140  high on  140   1.2069  m/s  735.9493  g emitted
Period  140 - 141  high on  141   1.24713  m/s  1160.283  g emitted
Period  141 - 142  high on  141   1.24713  m/s  1160.283  g emitted
Period  142 - 143  high on  142   1.2069  m/s  735.9493  g emitted
Period  167 - 168  high on  168   1.16667  m/s  364.5446  g emitted
Period  168 - 169  high on  168   1.16667  m/s  364.5446  g emitted
Period  191 - 192  high on  192   1.2069  m/s  735.9493  g emitted
Period  192 - 193  high on  193   1.56897  m/s  6460.352  g emitted
Period  193 - 194  high on  193   1.56897  m/s  6460.352  g emitted
Period  206 - 207  high on  207   1.2069  m/s  735.9493  g emitted
Period  207 - 208  high on  207   1.2069  m/s  735.9493  g emitted
Period  211 - 212  high on  212   1.32759  m/s  2167.734  g emitted
Period  212 - 213  high on  212   1.32759  m/s  2167.734  g emitted
Period  322 - 323  high on  323   1.2069  m/s  735.9493  g emitted
Period  323 - 324  high on  323   1.2069  m/s  735.9493  g emitted
Period  332 - 333  high on  333   1.12644  m/s  46.0676  g emitted
Period  333 - 334  high on  333   1.12644  m/s  46.0676  g emitted
Period  352 - 353  high on  353   1.16667  m/s  364.5446  g emitted
Period  353 - 354  high on  353   1.16667  m/s  364.5446  g emitted
Period  354 - 355  high on  354   1.12644  m/s  46.0676  g emitted

Summary for Us/Ur =  .9      Disturbance Interval =  1
 71139.55  Total g emitted over  1  -  365
-----------------------------------------------------------------
Us/Ur =  .6    Disturbance interval = 1  days

Period  61 - 62  high on  62   1.23372  m/s  4051.837  g emitted
Period  62 - 63  high on  62   1.23372  m/s  4051.837  g emitted

Summary for Us/Ur =  .6      Disturbance Interval =  1
 8103.673  Total g emitted over  1  -  365
-----------------------------------------------------------------
Us/Ur =  .2    Disturbance interval = 1  days


Summary for Us/Ur =  .2      Disturbance Interval =  1
 0  Total g emitted over  1  -  365
-----------------------------------------------------------------
Summary for entire source:  79243.23   g emitted over period  1  -  365
NOTE: For a variety of reasons given in the user manual, the erosion estimates
      presented above may be considered as CONSERVATIVELY HIGH.  See the
      user manual for more information.
```

# APPENDIX D

# BASIS OF ACTUAL EMISSIONS FOR OSCEOLA FARMS BOILERS

Table D-1. Current Actual Emissions (2000-2001), Osceola Farms Company

| Boiler | Annual Heat Input Rate [c] (MMBtu/yr) | Actual Annual Emissions (TPY) PM | $PM_{10}$ | $SO_2$ | $NO_x$ | CO | VOC | Hg | F | Pb | SAM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001[a] | | | | | | | | | | | |
| Boiler 2 | 782,786 | 61.02 | 51.88 | 30.02 | 71.64 | 1,516.09 | 156.55 | 3.04E-03 | 0.162 | 9.40E-03 | 1.839 |
| Boiler 3 | 856,967 | 70.22 | 59.70 | 29.74 | 61.87 | 1,672.20 | 63.03 | 3.35E-03 | 0.178 | 1.03E-02 | 1.822 |
| Boiler 4 | 857,679 | 83.78 | 71.26 | 48.84 | 71.06 | 1,597.61 | 138.46 | 3.21E-03 | 0.175 | 1.01E-02 | 2.991 |
| Boiler 5 | 849,986 | 72.19 | 61.38 | 42.46 | 79.08 | 1,593.13 | 160.88 | 3.20E-03 | 0.173 | 9.98E-03 | 2.601 |
| Boiler 6 | 956,793 | 49.82 | 42.35 | 23.72 | 20.40 | 1,888.41 | 100.11 | 3.77E-03 | 0.198 | 1.16E-02 | 1.453 |
| Total--*2001* | 4,304,211 | 337.02 | 286.57 | 174.78 | 304.06 | 8,267.44 | 619.03 | 1.66E-02 | 0.886 | 5.14E-02 | 10.705 |
| 2000[b] | | | | | | | | | | | |
| Boiler 2 | 674,607 | 56.87 | 48.35 | 28.62 | 71.95 | 1,311.47 | 148.39 | 2.62E-03 | 0.140 | 8.12E-03 | 1.752 |
| Boiler 3 | 702,691 | 36.51 | 31.04 | 27.20 | 50.49 | 1,376.62 | 51.93 | 2.75E-03 | 0.146 | 8.50E-03 | 1.665 |
| Boiler 4 | 704,462 | 83.20 | 70.76 | 42.66 | 70.57 | 1,317.92 | 99.41 | 2.65E-03 | 0.144 | 8.29E-03 | 2.612 |
| Boiler 5 | 682,750 | 51.79 | 44.04 | 39.41 | 84.07 | 1,285.12 | 19.25 | 2.58E-03 | 0.140 | 8.06E-03 | 2.413 |
| Boiler 6 | 794,579 | 37.46 | 31.84 | 24.65 | 17.25 | 1,581.27 | 83.80 | 3.16E-03 | 0.166 | 9.70E-03 | 1.509 |
| Total--*2000* | 3,559,089 | 265.83 | 226.03 | 162.54 | 294.33 | 6,872.40 | 402.78 | 1.38E-02 | 0.735 | 4.27E-02 | 9.951 |
| Average | | | | | | | | | | | |
| Boiler 2 | 728,696 | 58.94 | 50.11 | 29.32 | 71.79 | 1,413.78 | 152.47 | 2.83E-03 | 0.151 | 8.76E-03 | 1.795 |
| Boiler 3 | 779,829 | 53.36 | 45.37 | 28.47 | 56.18 | 1,524.41 | 57.48 | 3.05E-03 | 0.162 | 9.42E-03 | 1.743 |
| Boiler 4 | 781,071 | 83.49 | 71.01 | 45.75 | 70.82 | 1,457.76 | 118.93 | 2.93E-03 | 0.159 | 9.18E-03 | 2.802 |
| Boiler 5 | 766,368 | 61.99 | 52.71 | 40.93 | 81.58 | 1,439.13 | 90.07 | 2.89E-03 | 0.156 | 9.02E-03 | 2.507 |
| Boiler 6 | 875,686 | 43.64 | 37.09 | 24.19 | 18.83 | 1,734.84 | 91.96 | 3.47E-03 | 0.182 | 1.06E-02 | 1.481 |
| Total--*2000 & 2001* | 3,931,650 | 301.43 | 256.30 | 168.66 | 299.19 | 7,569.92 | 510.90 | 1.52E-02 | 0.810 | 4.70E-02 | 10.328 |

[a] Refer to Tables D-2 through D-6 for derivation.

[b] Obtained from 2000 Annual Operating Report, except Hg, F, Pb, and SAM. Refer to Appendix D, Tables D-7 through D-11 for calculation of Hg, F, Pb, and SAM emissions.

[c] Heat input rates for 2001 were provided by Osceola Farms. Heat input rates for 2000 were obtained from the facility's Annual Operating Report.

Table D-2. 2001 Actual Annual Emissions for Boiler 2, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| PM | 139,832 | 1.17 | (1) | 0.082 | 761,685 | 0.16 | (6) | 60.93 | 61.02 |
| $PM_{10}$ | 139,832 | 1.17 | (2) | 0.082 | 761,685 | 0.14 | (7) | 51.79 | 51.88 |
| $SO_2$ | 139,832 | 157 | (3) | 10.977 | 761,685 | 0.05 | (8) | 19.04 | 30.02 |
| $NO_x$ | 139,832 | 55 | (4) | 3.845 | 761,685 | 0.18 | (6) | 67.79 | 71.64 |
| CO | 139,832 | 5 | (4) | 0.350 | 761,685 | 3.98 | (8) | 1,515.7 | 1,516.09 |
| VOC | 139,832 | 0.28 | (4) | 0.020 | 761,685 | 0.41 | (6) | 156.5 | 156.55 |
| Hg | 139,832 | 1.13E-04 | (11) | 7.90E-06 | 761,685 | 7.95E-06 | (9) | 3.03E-03 | 3.04E-03 |
| F | 139,832 | 3.73E-02 | (11) | 2.61E-03 | 761,685 | 4.18E-04 | (10) | 0.159 | 0.162 |
| Pb | 139,832 | 1.51E-03 | (11) | 1.06E-04 | 761,685 | 2.44E-05 | (10) | 9.30E-03 | 9.40E-03 |
| SAM | 139,832 | 10 | (5) | 0.672 | 761,685 | 3.06E-03 | (5) | 1.17 | 1.84 |

[a] Provided by Osceola Farms.

References:

1. Based on AP-42 Section 1.3 (USEPA 9/98) formula 10(S) + 3 lb/1000 gal, where S = 1.0%, and scrubber removal efficiency of 91%.
2. $PM_{10}$ assumed as 100% of PM.
3. Based on AP-42 Section 1.3 (USEPA 9/98) formula 157(S) lb/1000 gal, where S = 1.0%.
4. Based on AP-42 Section 1.3 (USEPA 9/98).
5. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
6. From actual 2000/2001 stack test data.
7. $PM_{10}$ assumed as 85% of PM.
8. Based on historical stack test data from 1989-1990.
9. Based on Osceola mercury emission testing program for 1992-1993 crop season.
10. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
11. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-3. 2001 Actual Annual Emissions for Boiler 3, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| PM | 111,340 | 1.17 | (1) | 0.065 | 840,165 | 0.17 | (6) | 70.15 | 70.22 |
| $PM_{10}$ | 111,340 | 1.17 | (2) | 0.065 | 840,165 | 0.14 | (7) | 59.63 | 59.70 |
| $SO_2$ | 111,340 | 157 | (3) | 8.74 | 840,165 | 0.05 | (8) | 21.00 | 29.74 |
| $NO_x$ | 111,340 | 55 | (4) | 3.06 | 840,165 | 0.14 | (8) | 58.81 | 61.87 |
| CO | 111,340 | 5 | (4) | 0.28 | 840,165 | 3.98 | (8) | 1,671.9 | 1,672.20 |
| VOC | 111,340 | 0.28 | (4) | 0.016 | 840,165 | 0.15 | (8) | 63.0 | 63.03 |
| Hg | 111,340 | 1.13E-04 | (11) | 6.29E-06 | 840,165 | 7.95E-06 | (9) | 3.34E-03 | 3.35E-03 |
| F | 111,340 | 3.73E-02 | (11) | 2.08E-03 | 840,165 | 4.18E-04 | (10) | 0.176 | 0.178 |
| Pb | 111,340 | 1.51E-03 | (11) | 8.41E-05 | 840,165 | 2.44E-05 | (10) | 1.03E-02 | 1.03E-02 |
| SAM | 111,340 | 10 | (5) | 0.535 | 840,165 | 3.1.E-03 | (5) | 1.29 | 1.82 |

[a] Provided by Osceola Farms.

References:

1. Based on AP-42 Section 1.3 (USEPA 9/98) formula 10(S) + 3 lb/1000 gal, where S = 1.0%, and scrubber removal efficiency of 91%.
2. $PM_{10}$ assumed as 100% of PM.
3. Based on AP-42 Section 1.3 (USEPA 9/98) formula 157(S) lb/1000 gal, where S = 1.0%.
4. Based on AP-42 Section 1.3 (USEPA 9/98).
5. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
6. From actual 2000/2001 stack test data.
7. $PM_{10}$ assumed as 85% of PM.
8. Based on historical stack test data from 1989-1990.
9. Based on Osceola mercury emission testing program for 1992-1993 crop season.
10. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
11. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-4. 2001 Actual Annual Emissions for Boiler 4, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| PM | 366,581 | 1.82 | (1) | 0.33 | 802,362 | 0.21 | (6) | 83.45 | 83.78 |
| $PM_{10}$ | 366,581 | 1.82 | (2) | 0.33 | 802,362 | 0.18 | (7) | 70.93 | 71.26 |
| $SO_2$ | 366,581 | 157 | (3) | 28.78 | 802,362 | 0.05 | (8) | 20.06 | 48.84 |
| $NO_x$ | 366,581 | 55 | (4) | 10.08 | 802,362 | 0.15 | (6) | 60.98 | 71.06 |
| CO | 366,581 | 5 | (4) | 0.92 | 802,362 | 3.98 | (8) | 1,596.7 | 1,597.61 |
| VOC | 366,581 | 0.28 | (4) | 0.051 | 802,362 | 0.35 | (6) | 138.4 | 138.46 |
| Hg | 366,581 | 1.13E-04 | (11) | 2.07E-05 | 802,362 | 7.95E-06 | (9) | 3.19E-03 | 3.21E-03 |
| F | 366,581 | 3.73E-02 | (11) | 6.84E-03 | 802,362 | 4.18E-04 | (10) | 0.168 | 0.175 |
| Pb | 366,581 | 1.51E-03 | (11) | 2.77E-04 | 802,362 | 2.44E-05 | (10) | 9.79E-03 | 1.01E-02 |
| SAM | 366,581 | 10 | (5) | 1.763 | 802,362 | 3.1.E-03 | (5) | 1.23 | 2.99 |

[a] Provided by Osceola Farms.

References:

1. Based on AP-42 Section 1.3 (USEPA 9/98) formula 10(S) + 3 lb/1000 gal, where S = 1.0%, and scrubber removal efficiency of 86%.
2. $PM_{10}$ assumed as 100% of PM.
3. Based on AP-42 Section 1.3 (USEPA 9/98) formula 157(S) lb/1000 gal, where S = 1.0%.
4. Based on AP-42 Section 1.3 (USEPA 9/98).
5. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
6. From actual 2000/2001 stack test data.
7. $PM_{10}$ assumed as 85% of PM.
8. Based on historical stack test data from 1989-1990.
9. Based on Osceola mercury emission testing program for 1992-1993 crop season.
10. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
11. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-5. 2001 Actual Annual Emissions for Boiler 5, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| PM | 286,028 | 1.17 | (1) | 0.167 | 800,214 | 0.18 | (6) | 72.02 | 72.19 |
| $PM_{10}$ | 286,028 | 1.17 | (2) | 0.167 | 800,214 | 0.15 | (7) | 61.22 | 61.38 |
| $SO_2$ | 286,028 | 157 | (3) | 22.453 | 800,214 | 0.05 | (8) | 20.01 | 42.46 |
| $NO_x$ | 286,028 | 55 | (4) | 7.866 | 800,214 | 0.18 | (6) | 71.22 | 79.08 |
| CO | 286,028 | 5 | (4) | 0.715 | 800,214 | 3.98 | (8) | 1,592.4 | 1,593.13 |
| VOC | 286,028 | 0.28 | (4) | 0.040 | 800,214 | 0.40 | (6) | 160.8 | 160.88 |
| Hg | 286,028 | 1.13E-04 | (11) | 1.62E-05 | 800,214 | 7.95E-06 | (9) | 3.18E-03 | 3.20E-03 |
| F | 286,028 | 3.73E-02 | (11) | 5.33E-03 | 800,214 | 4.18E-04 | (10) | 0.167 | 0.173 |
| Pb | 286,028 | 1.51E-03 | (11) | 2.16E-04 | 800,214 | 2.44E-05 | (10) | 9.77E-03 | 9.98E-03 |
| SAM | 286,028 | 10 | (5) | 1.375 | 800,214 | 3.1.E-03 | (5) | 1.23 | 2.60 |

[a] Provided by Osceola Farms.

References:

1. Based on AP-42 Section 1.3 (USEPA 9/98) formula 10(S) + 3 lb/1000 gal, where S = 1.0%, and scrubber removal efficiency of 91%.
2. $PM_{10}$ assumed as 100% of PM.
3. Based on AP-42 Section 1.3 (USEPA 9/98) formula 157(S) lb/1000 gal, where S = 1.0%.
4. Based on AP-42 Section 1.3 (USEPA 9/98).
5. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
6. From actual 2000/2001 stack test data.
7. $PM_{10}$ assumed as 85% of PM.
8. Based on historical stack test data from 1989-1990.
9. Based on Osceola mercury emission testing program for 1992-1993 crop season.
10. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
11. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-6. 2001 Actual Annual Emissions for Boiler 6, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| PM | 0 | 1.17 | (1) | 0 | 948,956 | 0.11 | (6) | 49.82 | 49.82 |
| $PM_{10}$ | 0 | 1.17 | (2) | 0 | 948,956 | 0.09 | (7) | 42.35 | 42.35 |
| $SO_2$ | 0 | 157 | (3) | 0 | 948,956 | 0.05 | (8) | 23.72 | 23.72 |
| $NO_x$ | 0 | 55 | (4) | 0 | 948,956 | 0.04 | (8) | 20.40 | 20.40 |
| CO | 0 | 5 | (4) | 0 | 948,956 | 3.98 | (8) | 1,888.4 | 1,888.41 |
| VOC | 0 | 0.28 | (4) | 0 | 948,956 | 0.21 | (8) | 100.1 | 100.11 |
| Hg | 0 | 1.13E-04 | (11) | 0 | 948,956 | 7.95E-06 | (9) | 3.77E-03 | 3.77E-03 |
| F | 0 | 3.73E-02 | (11) | 0 | 948,956 | 4.18E-04 | (10) | 0.198 | 0.198 |
| Pb | 0 | 1.51E-03 | (11) | 0 | 948,956 | 2.44E-05 | (10) | 1.16E-02 | 1.16E-02 |
| SAM | 0 | 10 | (5) | 0 | 948,956 | 3.06E-03 | (5) | 1.45 | 1.45 |

[a] Provided by Osceola Farms.

References:

1. Based on AP-42 Section 1.3 (USEPA 9/98) formula 10(S) + 3 lb/1000 gal, where S = 1.0%, and scrubber removal efficiency of 91%.
2. $PM_{10}$ assumed as 100% of PM.
3. Based on AP-42 Section 1.3 (USEPA 9/98) formula 157(S) lb/1000 gal, where S = 1.0%.
4. Based on AP-42 Section 1.3 (USEPA 9/98).
5. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
6. From actual 2000/2001 stack test data.
7. $PM_{10}$ assumed as 85% of PM.
8. Based on historical stack test data from 1989-1990.
9. Based on Osceola mercury emission testing program for 1992-1993 crop season.
10. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
11. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-7. 2000 Actual Annual Hg, F, Pb, and SAM Emissions for Boiler 2, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| Hg | 104,200 | 1.13E-04 | (4) | 5.89E-06 | 658,873 | 7.95E-06 | (2) | 2.62E-03 | 2.62E-03 |
| F | 104,200 | 3.73E-02 | (4) | 1.94E-03 | 658,873 | 4.18E-04 | (3) | 0.138 | 0.140 |
| Pb | 104,200 | 1.51E-03 | (4) | 7.87E-05 | 658,873 | 2.44E-05 | (3) | 8.04E-03 | 8.12E-03 |
| SAM | 104,200 | 10 | (1) | 0.50 | 658,873 | 3.80E-03 | (1) | 1.25 | 1.75 |

[a] Obtained from the facility's 2000 Annual Operating Report.

References:

1. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
2. Based on Osceola mercury emission testing program for 1992-1993 crop season.
3. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
4. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-8. 2000 Actual Annual Hg, F, Pb, and SAM Emissions for Boiler 3, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| Hg | 73,100 | 1.13E-04 | (4) | 4.13E-06 | 691,653 | 7.95E-06 | (2) | 2.75E-03 | 2.75E-03 |
| F | 73,100 | 3.73E-02 | (4) | 1.36E-03 | 691,653 | 4.18E-04 | (3) | 0.145 | 0.146 |
| Pb | 73,100 | 1.51E-03 | (4) | 5.52E-05 | 691,653 | 2.44E-05 | (3) | 8.44E-03 | 8.50E-03 |
| SAM | 73,100 | 10 | (1) | 0.35 | 691,653 | 3.80E-03 | (1) | 1.31 | 1.66 |

[a] Obtained from the facility's 2000 Annual Operating Report.

References:

1. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
2. Based on Osceola mercury emission testing program for 1992-1993 crop season.
3. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
4. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-9. 2000 Actual Annual Hg, F, Pb, and SAM Emissions for Boiler 4, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| Hg | 281,900 | 1.13E-04 | (4) | 1.59E-05 | 661,895 | 7.95E-06 | (2) | 2.63E-03 | 2.65E-03 |
| F | 281,900 | 3.73E-02 | (4) | 5.26E-03 | 661,895 | 4.18E-04 | (3) | 0.138 | 0.144 |
| Pb | 281,900 | 1.51E-03 | (4) | 2.13E-04 | 661,895 | 2.44E-05 | (3) | 8.08E-03 | 8.29E-03 |
| SAM | 281,900 | 10 | (1) | 1.36 | 661,895 | 3.80E-03 | (1) | 1.26 | 2.61 |

[a] Obtained from the facility's 2000 Annual Operating Report.

References:

1. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
2. Based on Osceola mercury emission testing program for 1992-1993 crop season.
3. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
4. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-10. 2000 Actual Annual Hg, F, Pb, and SAM Emissions for Boiler 5, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| Hg | 247,000 | 1.13E-04 | (4) | 1.40E-05 | 645,453 | 7.95E-06 | (2) | 2.57E-03 | 2.58E-03 |
| F | 247,000 | 3.73E-02 | (4) | 4.61E-03 | 645,453 | 4.18E-04 | (3) | 0.135 | 0.140 |
| Pb | 247,000 | 1.51E-03 | (4) | 1.86E-04 | 645,453 | 2.44E-05 | (3) | 7.88E-03 | 8.06E-03 |
| SAM | 247,000 | 10 | (1) | 1.19 | 645,453 | 3.80E-03 | (1) | 1.23 | 2.41 |

[a] Obtained from the facility's 2000 Annual Operating Report.

References:

1. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
2. Based on Osceola mercury emission testing program for 1992-1993 crop season.
3. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
4. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-11. 2000 Actual Annual Hg, F, Pb, and SAM Emissions for Boiler 6, Osceola Farms Company

| | No. 6 Fuel Oil | | | | Bagasse | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pollutant | Fuel Usage[a] (gal/yr) | Emission Factor (lb/1,000 gal) | Ref. | Boiler Emissions (TPY) | Heat Input[a] (MMBtu/yr) | Emission Factor (lb/MMBtu) | Ref. | Boiler Emissions (TPY) | Total Emissions (TPY) |
| Hg | 0 | 1.13E-04 | (4) | 0 | 794,579 | 7.95E-06 | (2) | 3.16E-03 | 3.16E-03 |
| F | 0 | 3.73E-02 | (4) | 0 | 794,579 | 4.18E-04 | (3) | 0.166 | 0.166 |
| Pb | 0 | 1.51E-03 | (4) | 0 | 794,579 | 2.44E-05 | (3) | 9.70E-03 | 9.70E-03 |
| SAM | 0 | 10 | (1) | 0 | 794,579 | 3.80E-03 | (1) | 1.51 | 1.51 |

[a] Obtained from the facility's 2000 Annual Operating Report.

References:

1. Based on emission factor for $SO_2$, assuming a 5% conversion of $SO_2$ to $SO_3$, and taking into account the ratio of molecular weights (98/80).
2. Based on Osceola mercury emission testing program for 1992-1993 crop season.
3. Based on 2 most recent stack tests for New Hope Power Partnership (Okeelanta Power) when burning bagasse.
4. From AP-42 Table 1.3-11 (USEPA 9/98).

Table D-12. Osceola Farms Current Maximum Short-Term $SO_2$ Emissions (01/30/02)

| Boiler | Maximum Steam Rate (lb/hr) | Total Maximum Heat Input (MMBtu/hr) | Maximum Heat Input From Fuel Oil[a] (MMBtu/hr) | Rates During Worst-Case Fuel Oil Usage Period[b]: Steam Rate (lb/hr) | Total Heat Input (MMBtu/hr) | Fuel Oil[c] gal/hr | Fuel Oil[c] MMBtu/hr | Bagasse (MMBtu/hr) | Modeled $SO_2$ Emissions: Fuel Oil[d] (lb/hr) | Bagasse[e] (lb/hr) | Total (lb/hr) | Total (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 24-HR AVERAGE | | | | | | | | |
| 2 | 140,000 | 280 | 82.5 | 125,800 | 252 | 227 | 34.1 | 217.5 | 35.7 | 10.9 | 46.6 | 5.87 |
| 3 | 150,000 | 292 | 75.4 | 138,525 | 270 | 244 | 36.6 | 233.1 | 39.0 | 11.7 | 50.7 | 6.38 |
| 4 | 140,000 | 280 | 82.5 | 129,188 | 258 | 234 | 35.0 | 223.3 | 37.4 | 11.2 | 48.5 | 6.12 |
| 5 | 169,000 | 330 | 82.5 | 146,250 | 286 | 258 | 38.7 | 246.9 | 41.3 | 12.3 | 53.6 | 6.76 |
| 6 | 195,000 | 379 | 75.4 | 170,000 | 330 | 0 | 0.0 | 330.4 | 0.0 | 16.5 | 16.5 | 2.08 |
| Totals | 794,000 | 1,561.0 | 398.3 | 709,763 (17,034,300 lb/24-hr) | 1,396 | 963 (23,109 gallons per 24-hour period) | 144.4 | 1,251.2 | 153.4 | 62.6 | 215.9 | 27.2 |

[a] Based on maximum capacity of fuel oil burners.

[b] Worst-case day fuel oil usage was 23,109 gallons per day on Oct. 19, 2001.

[c] Boiler No. 6 does not burn any oil. Heating value = 150,000 Btu/gal.

[d] Using AP-42 factor for No. 6 fuel oil: 157(S) lb/1000 gal; 1.0% sulfur (from AORs).

[e] Using 0.05 lb/MMBtu $SO_2$ due to bagasse firing, based on Osceola Farms test data.

# APPENDIX E

# BACT COST ESTIMATES

# CUECost

## Coal Utility Environmental Cost

*Version 1, November 25, 1998 (revised 2-9-00 as CUECost3.xls)*

**Developed for EPA**

by Raytheon Engineers & Constructors and Eastern Research Group

*Current Date:* *14-Feb-02*

| *APC Technology Choices* | | |
|---|---|---|
| | | |
| **Description** | **Units** | **Input 1** |
| | | |
| FGD Process | Integer | 2 |
| (1 = LSFO, 2 = LSD) | | |
| Particulate Control | Integer | 1 |
| (1 = Fabric Filter, 2 = ESP) | | |
| NOx Control | Integer | 2 |
| (1 = SCR, 2 = SNCR, 3 = LNBs, 4 = NGR) | | |
| | | |

| *INPUTS* | | |
|---|---|---|
| | | |
| **Description** | **Units** | **Input 1** |
| | | |
| ***General Plant Technical Inputs*** | | |
| | | |
| Location - State | Abbrev. | FL |
| MW Equivalent of Flue Gas to Control System | MW | 100 |
| Net Plant Heat Rate | Btu/kWhr | 10,500 |
| Plant Capacity Factor | % | 80% |
| Total Air Downstream of Economizer | % | 120% |
| Air Heater Leakage | % | 12% |
| Air Heater Outlet Gas Temperature | °F | 300 |
| Inlet Air Temperature | °F | 80 |
| Ambient Absolute Pressure | In. of Hg | 29.4 |
| Pressure After Air Heater | In. of H2O | -12 |
| Moisture in Air | lb/lb dry air | 0.013 |
| Ash Split: | | |
| Fly Ash | % | 80% |
| Bottom Ash | % | 20% |
| Seismic Zone | Integer | 1 |
| Retrofit Factor | Integer | 1.3 |
| (1.0 = new, 1.3 = medium, 1.6 = difficult) | | |
| Select Coal | Integer | 8 |
| Is Selected Coal a Powder River Basin Coal? | Yes / No | No |
| | | |
| ***Economic Inputs*** | | |
| | | |
| Cost Basis -Year Dollars | Year | 1998 |
| Sevice Life (levelization period) | Years | 20 |
| Inflation Rate | % | 3% |
| After Tax Discount Rate (current $'s) | % | 7% |
| AFDC Rate (current $'s) | % | 8% |
| First-year Carrying Charge (current $'s) | % | 17% |
| Levelized Carrying Charge (current $'s) | % | 13% |
| First-year Carrying Charge (constant $'s) | % | 12% |
| Levelized Carrying Charge (constant $'s) | % | 9% |
| Sales Tax | % | 6% |
| Escalation Rates: | | |
| Consumables (O&M) | % | 3% |
| Capital Costs: | | |

| *INPUTS* | | |
|---|---|---|
| | | |
| **Description** | **Units** | **Input 1** |
| Is Chem. Eng. Cost Index available? | Yes / No | No |
| If "Yes" input cost basis CE Plant Index. | Integer | 388 |
| If "No" input escalation rate. | % | 3% |
| Construction Labor Rate | $/hr | $35 |
| Prime Contractor's Markup | % | 3% |
| Operating Labor Rate | $/hr | $30 |
| Power Cost | Mills/kWh | 25 |
| Steam Cost | $/1000 lbs | 3.5 |
| | | |

| ***INPUTS*** | | |
|---|---|---|
| **Description** | **Units** | **Input 1** |
| ***Lime Spray Dryer (LSD) Inputs*** | | |
| SO2 Removal Required | % | 90% |
| Adiabatic Saturation Temperature | °F | 127 |
| Flue Gas Approach to Saturation | °F | 20 |
| Spray Dryer Outlet Temperature | °F | 147 |
| Reagent Feed Ratio | Factor | 0.92 |
| (Mole CaO / Mole Inlet SO2) | | |
| Recycle Rate | Factor | 30 |
| (lb recycle / lb lime feed) | | |
| Recycle Slurry Solids Concentration | Wt. % | 35% |
| Number of Absorbers | Integer | 2 |
| (Max. Capacity = 300 MW per spray dryer) | | |
| Absorber Material | Integer | 1 |
| (1 = alloy, 2 = RLCS) | | |
| Spray Dryer Pressure Drop | in. H2O | 5 |
| Reagent Bulk Storage | Days | 60 |
| Reagent Cost (delivered) | $/ton | $65 |
| Dry Waste Disposal Cost | $/ton | $30 |
| Maintenance Factors by Area (% of Installed Cost) | | |
| Reagent Feed | % | 5% |
| SO2 Removal | % | 5% |
| Flue Gas Handling | % | 5% |
| Waste / Byproduct | % | 5% |
| Support Equipment | % | 5% |
| Contingency by Area (% of Installed Cost) | | |
| Reagent Feed | % | 20% |
| SO2 Removal | % | 20% |
| Flue Gas Handling | % | 20% |
| Waste / Byproduct | % | 20% |
| Support Equipment | % | 20% |
| General Facilities by Area (% of Installed Cost) | | |
| Reagent Feed | % | 10% |
| SO2 Removal | % | 10% |
| Flue Gas Handling | % | 10% |
| Waste / Byproduct | % | 10% |
| Support Equipment | % | 10% |
| Engineering Fees by Area (% of Installed Cost) | | |
| Reagent Feed | % | 10% |
| SO2 Removal | % | 10% |
| Flue Gas Handling | % | 10% |
| Waste / Byproduct | % | 10% |
| Support Equipment | % | 10% |

| | | | Coal 8, "User Specif |
|---|---|---|---|
| | **COAL ANALYSIS LIBRARY** | | |
| | | | |
| | Index Number | | 8 |
| 1 | Coal Name | | "User Specified" |
| 2 | Coal Cost | $/MMBtu | 1.50 |
| 3 | PROXIMATE ANALYSIS (ASTM, as rec'd) | | |
| 4 | **Moisture - Enter below in Ultimate Analysis** | | |
| 5 | Volatile Matter | wt% | **45.00** |
| 6 | Fixed Carbon | wt% | **8.58** |
| 7 | **Ash - Enter below in Ultimate Analysis** | | |
| 8 | | | 100.00 |
| 9 | | | |
| 10 | COAL ULTIMATE ANALYSIS (ASTM, as rec'd) | | |
| 11 | Moisture | wt% | **43.00** |
| 12 | Carbon | wt% | **28.00** |
| 13 | Hydrogen | wt% | **3.40** |
| 14 | Nitrogen | wt% | **0.17** |
| 15 | Chlorine | wt% | **0.00** |
| 16 | Sulfur | wt% | **0.012** |
| 17 | Ash | wt% | **3.42** |
| 18 | Oxygen | wt% | **22.00** |
| 19 | TOTAL | wt% | 100.00 |
| 20 | | | |
| 21 | Modified Mott Spooner HHV (Btu/lb) - *calc* | Btu/lb | 4,729 |
| 22 | | | |
| 23 | COAL ASH ANALYSIS (ASTM, as rec'd) | | |
| 24 | SiO2 | wt% | **35.51** |
| 25 | Al2O3 | wt% | **17.11** |
| 26 | TiO2 | wt% | **1.26** |
| 27 | Fe2O3 | wt% | **6.07** |
| 28 | CaO | wt% | **26.67** |
| 29 | MgO | wt% | **5.30** |
| 30 | Na2O | wt% | **1.68** |
| 31 | K2O | wt% | **2.87** |
| 32 | P2O5 | wt% | **0.97** |
| 33 | SO3 | wt% | **1.56** |
| 34 | Other Unaccounted for | wt% | **1.00** |
| 35 | TOTAL | wt% | 100.00 |
| 36 | | | |

| *SUMMARY OF COSTS* | | |
|---|---|---|
| **Description** | **Units** | **Input 1** |
| ***APC Technologies*** | | |
| NOx Control | | SNCR |
| Particulate Control | | PJFF |
| SO2 Control | | LSD |
| ***SO2 Control Costs*** | | LSD |
| **Total Capital Requirement (TCR)** | $ | $41,191,492 |
| | $/kW | $412 |
| **First Year Costs** | | |
| *Fixed O&M* | $ | $2,354,729 |
| | $/kW-Yr | 23.55 |
| | Mills/kWH | 3.36 |
| | $/ton SO2 removed | $14,026.4 |
| *Variable O&M* | $ | $806,582 |
| | $/kW-Yr | 8.07 |
| | Mills/kWH | 1.15 |
| | $/ton SO2 removed | $4,804.5 |
| *Fixed Charges* | $ | $7,002,554 |
| | $/kW-Yr | 70.03 |
| | Mills/kWH | 9.99 |
| | $/ton SO2 removed | $41,711.9 |
| *TOTAL* | $ | $10,163,865 |
| | $/kW-Yr | 101.64 |
| | Mills/kWH | 14.50 |
| | $/ton SO2 removed | $60,543 |
| **Levelized Current Dollars** | | |
| *Fixed O&M* | $/kW-Yr | 30.52 |
| | Mills/kWH | 4.36 |
| | $/ton SO2 removed | $18,180.5 |
| *Variable O&M* | $/kW-Yr | 10.45 |
| | Mills/kWH | 1.49 |
| | $/ton SO2 removed | $6,227.5 |
| *Fixed Charges* | $/kW-Yr | 53.55 |
| | Mills/kWH | 7.64 |
| | $/ton SO2 removed | $31,897.4 |
| *TOTAL* | $/kW-Yr | 94.52 |
| | Mills/kWH | 13.49 |
| | $/ton SO2 removed | $56,305.4 |
| **Levelized Constant Dollars** | | |
| *Fixed O&M* | $/kW-Yr | 23.55 |
| | Mills/kWH | 3.36 |
| | $/ton SO2 removed | $14,026.4 |
| *Variable O&M* | $/kW-Yr | 8.07 |
| | Mills/kWH | 1.15 |
| | $/ton SO2 removed | $4,804.5 |
| *Fixed Charges* | $/kW-Yr | 37.07 |
| | Mills/kWH | 7.49 |
| | $/ton SO2 removed | $31,284.0 |
| *TOTAL* | $/kW-Yr | 68.69 |
| | Mills/kWH | 12.01 |
| | $/ton SO2 removed | $50,114.9 |

| ***LSD Equipment Capital Costs*** | | | Case1 |
|---|---|---|---|
| ***Cost Basis (Year)*** | | | ***1998*** |
| | | *Sizing Criteria* | |
| Reagent Feed System | $ | * | $3,822,663 |
| SO2 Removal System | $ | Wt. % S | $2,048,916 |
| Spray Dryers | $ | kACFM | $7,243,803 |
| Flue Gas Handling System | $ | kACFM | $2,164,475 |
| ID Fans | $ | ACFM | $597,933 |
| Waste / Byproduct Handling System | $ | kpph SO2 | $1,026,335 |
| Support Equipment | $ | MW | $1,613,026 |
| Chimney | $ | ACFM | $2,877,751 |
| **TOTAL** | $ | | $21,394,902 |
| ** Based on lbs/hr of lime feed and GPM of lime slurry.* | | | |
| | | | |
| ***Capital Costs with Retrofit Factors*** | | | |
| Reagent Feed System | $ | | $4,969,461 |
| SO2 Removal System | $ | | $2,663,590 |
| Spray Dryers | $ | | $9,416,944 |
| Flue Gas Handling System | $ | | $2,813,817 |
| ID Fans | $ | | $777,313 |
| Waste / Byproduct Handling System | $ | | $1,334,236 |
| Support Equipment | $ | | $2,096,934 |
| Chimney | $ | | $3,741,076 |
| **TOTAL** | $ | | $27,813,372 |
| | | | |
| ***General Facilities*** | | | |
| Reagent Feed System | $ | | $496,946 |
| SO2 Removal System | $ | | $266,359 |
| Spray Dryers | $ | | $941,694 |
| Flue Gas Handling System | $ | | $281,382 |
| ID Fans | $ | | $77,731 |
| Waste / Byproduct Handling System | $ | | $133,424 |
| Support Equipment | $ | | $209,693 |
| Chimney | $ | | $374,108 |
| **TOTAL** | $ | | $2,781,337 |
| | | | |
| ***Engineering Fees*** | | | |
| Reagent Feed System | $ | | $496,946 |
| SO2 Removal System | $ | | $266,359 |
| Spray Dryers | $ | | $941,694 |
| Flue Gas Handling System | $ | | $281,382 |
| ID Fans | $ | | $77,731 |
| Waste / Byproduct Handling System | $ | | $133,424 |
| Support Equipment | $ | | $209,693 |
| Chimney | $ | | $374,108 |
| **TOTAL** | $ | | $2,781,337 |
| | | | |

| | | | |
|---|---|---|---|
| ***Contingency*** | | | |
| Reagent Feed System | $ | | $993,892 |
| SO2 Removal System | $ | | $532,718 |
| Spray Dryers | $ | | $1,883,389 |
| Flue Gas Handling System | $ | | $562,763 |
| ID Fans | $ | | $155,463 |
| Waste / Byproduct Handling System | $ | | $266,847 |
| Support Equipment | $ | | $419,387 |
| Chimney | $ | | $748,215 |
| **TOTAL** | $ | | $5,562,674 |
| | | | |
| ***Total Plant Cost (TPC)*** | $ | | $38,938,721 |
| ***Total Plant Cost (TPC) w/ Prime Contractor's M*** | $ | | $40,106,883 |
| ***Total Cash Expended (TCE)*** | $ | | $40,106,883 |
| | | | |
| ***Allow. for Funds During Constr. (AFDC*** | $ | | $0 |
| | | | |
| ***Total Plant Investment (TPI)*** | $ | | $40,106,883 |
| | | | |
| *Preproduction Costs* | $ | | $1,082,384 |
| *Inventory Capital* | $ | | $2,225 |
| | | | |
| ***Total Capital Requirement (TCR)*** | $ | | **$41,191,492** |
| | $/kW | | $412 |
| | | | |
| ***Maintenance Cost by Area*** | | | Case1 |
| | | | |
| ***TPC w/o Retrofit Factor*** | | | |
| Reagent Feed System | $ | | $5,504,634 |
| SO2 Removal System | $ | | $2,950,439 |
| Spray Dryers | $ | | $10,431,076 |
| Flue Gas Handling System | $ | | $3,116,844 |
| ID Fans | $ | | $861,024 |
| Waste / Byproduct Handling System | $ | | $1,477,923 |
| Support Equipment | $ | | $2,322,758 |
| Chimney | $ | | $4,143,961 |
| **TOTAL** | $ | | $30,808,659 |
| | | | |
| ***First Year Maintenance Costs*** | | | |
| Reagent Feed System | $ | | $275,232 |
| SO2 Removal System | $ | | $147,522 |
| Spray Dryers | $ | | $521,554 |
| Flue Gas Handling System | $ | | $155,842 |
| ID Fans | $ | | $43,051 |
| Waste / Byproduct Handling System | $ | | $73,896 |
| Support Equipment | $ | | $116,138 |

| | | | |
|---|---|---|---|
| Chimney | $ | | $207,198 |
| **TOTAL** | $ | | $1,540,433 |
| | | | |
| | | | |
| ***LSD O&M Data and Costs*** | | | Case1 |
| ***Cost Basis (Year)*** | | | ***1998*** |
| **Parameters** | | | |
| Reagent Required | lbs/hr | | 48 |
| | lbs/MMBtu | | 0.045 |
| Percent SO2 Removal | % | | 90% |
| FGD Solids - dry | lbs/hr | | 6,403 |
| - wetted | lbs/hr | | 8,003 |
| Fresh Water to FGD | gpm | | 0 |
| Blowdown Water to FGD | gpm | | 37 |
| Total FGD Power Consumption | kW | | 700 |
| | | | |
| **Fixed O&M Costs** | | | |
| Number of Operators | | | 8 |
| (40 hrs/week) | | | |
| Operating Labor Cost ** | $/yr | | $484,188 |
| Maint. Labor & Matls. Cost | $/yr | | $1,540,433 |
| Admin. & Support Labor | $/yr | | $330,108.34 |
| TOTAL | $/yr | | $2,354,729 |
| | | | |
| **Variable Operating Costs **** | | | |
| Reagent Costs | $/yr | | $10,830 |
| Disposal Costs | $/yr | | $673,032 |
| Credit for Byproduct | $/yr | | $0 |
| Steam Costs | $/yr | | $0 |
| Fresh Water Costs | $/yr | | $79 |
| Power Costs | $/yr | | $122,640 |
| TOTAL | $/yr | | $806,582 |
| ** *These costs assume inputs are in current dollars (no escalation included).* | | | |
| | | | |

# APPENDIX F

# AAQS AND PSD EMISSION INVENTORIES

Table F-1. Summary of $SO_2$ Sources Included in the Air Modeling Analysis

| AIRS Number | Facility | Units | Modeling ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Diameter (m) | Temper. (K) | Velocity (m/s) | Emission Rate(g/s) 3-Hour | 24-Hour | PSD Source? (EXP/CON) | Modeled in AAQS | Class II | Class I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990019 | Osceola Farms PSD Baseline [a] | | | | | | | | | | | | | | |
| | | Unit 1 PSD Baseline | OSBLR1B | -165 | 36 | 22.0 | 1.52 | 342.0 | 8.98 | -5.07 | -5.07 | EXP | No | Yes | Yes |
| | | Unit 2 PSD Baseline | OSBLR2B | 164 | -50 | 22.0 | 1.52 | 342.0 | 14.22 | -16.32 | -16.32 | EXP | No | Yes | Yes |
| | | Unit 3 PSD Baseline | OSBLR3B | 165 | -36 | 22.0 | 1.93 | 342.0 | 11.23 | -7.26 | -7.26 | EXP | No | Yes | Yes |
| | | Unit 4 PSD Baseline | OSBLR4B | 153 | -23 | 22.0 | 1.83 | 342.0 | 13.35 | -13.61 | -13.61 | EXP | No | Yes | Yes |
| 0990061 | US Sugar-Bryant [a] | | | | | | | | | | | | | | |
| | | Unit 5 PSD | USSBRY5 | -6,600 | 1,700 | 42.7 | 2.90 | 345.0 | 11.49 | 62.40 | 62.40 | CON | No | Yes | Yes |
| | | Unit 5 AAQS | USSBRY5 | -6,600 | 1,700 | 42.7 | 2.90 | 345.0 | 11.49 | 77.25 | 77.25 | No | Yes | No | No |
| | | Unit 1,2&3 PSD | USBRY123 | -6,600 | 1,700 | 19.8 | 1.64 | 342.0 | 36.40 | 160.68 | 160.68 | CON | No | Yes | Yes |
| | | Unit 1,2&3 AAQS | USBRY123 | -6,600 | 1,700 | 19.8 | 1.64 | 342.0 | 36.40 | 199.71 | 199.71 | No | Yes | No | No |
| | | Unit 1 PSD Baseline | USSBRY1B | -6,600 | 1,700 | 19.8 | 1.68 | 494.0 | 44.30 | -36.50 | -36.50 | EXP | No | Yes | Yes |
| | | Unit 2&3 PSD Baseline | USBRY23B | -6,600 | 1,700 | 19.8 | 1.68 | 344.0 | 37.90 | -73.00 | -73.00 | EXP | No | Yes | Yes |
| 0990026 | Sugar Cane Growers [a] | | | | | | | | | | | | | | |
| | | Unit 1&2 | SUGCN12 | -9,500 | -14,100 | 45.7 | 1.87 | 339.0 | 21.75 | 41.20 | 41.20 | CON | Yes | Yes | Yes |
| | | Unit 3 | SUGCN3 | -9,500 | -14,100 | 27.4 | 1.52 | 339.0 | 22.25 | 16.20 | 16.20 | CON | Yes | Yes | Yes |
| | | Unit 4 PSD | SUGCN4 | -9,500 | -14,100 | 54.9 | 2.44 | 339.0 | 21.73 | 38.20 | 38.20 | CON | Yes | Yes | Yes |
| | | Unit 5 | SUGCN5 | -9,500 | -14,100 | 45.7 | 2.30 | 339.0 | 15.94 | 27.90 | 27.90 | CON | Yes | Yes | Yes |
| | | Unit 8 PSD | SUGCN8 | -9,500 | -14,100 | 47.2 | 2.90 | 339.0 | 13.62 | 23.50 | 23.50 | CON | Yes | Yes | Yes |
| | | Unit 1&2 PSD Baseline | SUGCN12B | -9,500 | -14,100 | 24.4 | 1.40 | 344.0 | 11.40 | -24.20 | -24.20 | EXP | No | Yes | Yes |
| | | Unit 3 PSD Baseline | SUGCN3B | -9,500 | -14,100 | 24.4 | 1.60 | 344.0 | 15.60 | -4.40 | -4.40 | EXP | No | Yes | Yes |
| | | Unit 4 PSD Baseline | SUGCN4B | -9,500 | -14,100 | 25.9 | 1.63 | 344.0 | 11.20 | -24.20 | -24.20 | EXP | No | Yes | Yes |
| | | Unit 5 PSD Baseline | SUGCN5B | -9,500 | -14,100 | 24.4 | 1.40 | 344.0 | 15.20 | -16.20 | -16.20 | EXP | No | Yes | Yes |
| | | Unit 6&7 PSD Baseline | SUGCN67B | -9,500 | -14,100 | 12.2 | 1.52 | 606.0 | 11.20 | -51.00 | -51.00 | EXP | No | Yes | Yes |
| 990021 | Pratt & Whitney (United Technologies) | | | | | | | | | | | | | | |
| | | Heater | PRATARCH | 17,600 | -7,400 | 15.2 | 0.91 | 810.9 | 143.73 | 13.99 | 13.99 | CON | Yes | Yes | Yes |
| | | Boiler BO-12 | PRATBO12 | 17,600 | -7,400 | 4.6 | 0.76 | 533.2 | 6.92 | 0.51 | 0.51 | CON | Yes | Yes | Yes |
| | | A-10 Test Stand | PRATA10 | 17,600 | -7,400 | 5.8 | 4.17 | 410.9 | 106.68 | 0.55 | 0.55 | No | Yes | No | No |
| 0850102 | Bechtel Indiantown PSD | | BECHTIND | 1,200 | 24,100 | 150.9 | 4.88 | 333.2 | 30.50 | 75.64 | 75.64 | CON | Yes | Yes | Yes |

Table F-1. Summary of $SO_2$ Sources Included in the Air Modeling Analysis

| AIRS Number | Facility | Units | Modeling ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Diameter (m) | Temper. (K) | Velocity (m/s) | Emission Rate(g/s) 3-Hour | 24-Hour | PSD Source? (EXP/CON) | Modeled in AAQS | Class II | Class I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990016 | Atlantic Sugar [a] | | | | | | | | | | | | | | |
| | | Unit 1 | ATLSUG1 | 8,500 | -22,200 | 27.4 | 1.83 | 346.0 | 17.97 | 16.28 | 16.28 | CON | Yes | Yes | Yes |
| | | Unit 2 | ATLSUG2 | 8,500 | -22,200 | 27.4 | 1.83 | 350.0 | 23.36 | 16.28 | 16.28 | CON | Yes | Yes | Yes |
| | | Unit 3 | ATLSUG3 | 8,500 | -22,200 | 27.4 | 1.83 | 350.0 | 21.56 | 16.02 | 16.02 | CON | Yes | Yes | Yes |
| | | Unit 4 | ATLSUG4 | 8,500 | -22,200 | 27.4 | 1.83 | 344.0 | 25.16 | 16.21 | 16.21 | CON | Yes | Yes | Yes |
| | | Unit 5 PSD [b] | ATLSUG5 | 8,500 | -22,200 | 27.4 | 1.68 | 339.0 | 19.24 | 8.41 | 8.04 | CON | Yes | Yes | Yes |
| | | Unit 1 PSD Baseline | ATLSUG1B | 8,500 | -22,200 | 18.9 | 1.92 | 506.0 | 12.71 | -17.24 | -17.24 | EXP | No | Yes | Yes |
| | | Unit 2 PSD Baseline | ATLSUG2B | 8,500 | -22,200 | 18.9 | 1.92 | 511.0 | 10.89 | -22.52 | -22.52 | EXP | No | Yes | Yes |
| | | Unit 3 PSD Baseline | ATLSUG3B | 8,500 | -22,200 | 21.9 | 1.83 | 522.0 | 17.52 | -16.88 | -16.88 | EXP | No | Yes | Yes |
| | | Unit 4 PSD Baseline | ATLSUG4B | 8,500 | -22,200 | 18.3 | 1.83 | 344.0 | 15.03 | -16.88 | -16.88 | EXP | No | Yes | Yes |
| 0850001 | FPL Martin | | | | | | | | | | | | | | |
| | | Units 1&2 | MART12 | -1,300 | 25,500 | 152.1 | 7.99 | 420.9 | 21.03 | 1743.79 | 1743.79 | NO | Yes | No | No |
| | | Aux Blr PSD | MARTAUX | -1,300 | 25,500 | 18.3 | 1.10 | 535.4 | 15.24 | 12.90 | 12.90 | CON | Yes | Yes | Yes |
| | | Diesel Gens PSD | MARTGEN | -1,300 | 25,500 | 7.6 | 0.30 | 785.9 | 39.62 | 0.51 | 0.51 | CON | Yes | Yes | Yes |
| | | Units 3&4 PSD | MART34 | -1,300 | 25,500 | 64.9 | 6.10 | 410.9 | 18.90 | 470.40 | 470.40 | CON | Yes | Yes | Yes |
| | | Unit 8 | MART8 | -1,300 | 25,500 | 36.6 | 5.79 | 397.6 | 13.59 | 12.99 | 12.99 | CON | Yes | Yes | Yes |
| 0510001 | Everglades Sugar [b] Main Boiler | | EVERGLAD | -34,800 | -13,200 | 21.9 | 1.10 | 477.0 | 10.10 | 34.90 | 34.90 | NO | Yes | No | No |
| 0510003 | US Sugar - Clewiston [d] | | | | | | | | | | | | | | |
| | | PSD Baseline (On-crop season only) | | | | | | | | | | | | | |
| | | Unit 1 PSD Baseline | USSBRL1B | -38,300 | -10,500 | 23.1 | 1.86 | 344.0 | 30.20 | -79.86 | -58.21 | EXP | No | Yes | Yes |
| | | Unit 2 PSD Baseline | USSBLR2B | -38,300 | -10,500 | 23.1 | 1.86 | 343.0 | 35.70 | -79.86 | -58.21 | EXP | No | Yes | Yes |
| | | Unit 3 PSD Baseline | USSBLR3B | -38,300 | -10,500 | 27.4 | 2.29 | 342.0 | 14.70 | -48.30 | -33.20 | EXP | No | Yes | Yes |
| | | East Pellet Plant PSD Baseline | EPELLET | -38,300 | -10,500 | 12.2 | 1.52 | 347.0 | 8.54 | -10.30 | -10.30 | EXP | No | Yes | Yes |
| | | West Pellet Plant PSD Baseline | WPELLET | -38,300 | -10,500 | 15.7 | 1.52 | 347.0 | 8.54 | -10.30 | -10.30 | EXP | No | Yes | Yes |
| | | On-crop season future | | | | | | | | | | | | | |
| | | Unit 1 | USSBRL1N | -38,300 | -10,500 | 65.0 | 2.44 | 347.0 | 15.36 | 78.79 | 73.73 | CON | Yes | Yes | Yes |
| | | Unit 2 | USSBLR2N | -38,300 | -10,500 | 65.0 | 2.44 | 338.0 | 13.86 | 78.49 | 73.44 | CON | Yes | Yes | Yes |
| | | Unit 3 | USSBLR3N | -38,300 | -10,500 | 65.0 | 2.44 | 333.2 | 6.78 | 47.08 | 47.08 | CON | Yes | Yes | Yes |
| | | Unit 4 | USSBLR4N | -38,300 | -10,500 | 45.7 | 2.51 | 344.3 | 20.28 | 21.53 | 3.68 | CON | Yes | Yes | Yes |
| | | Unit 7 | USSBLR7N | -38,300 | -10,500 | 68.6 | 2.59 | 405.4 | 20.77 | 13.91 | 12.65 | CON | Yes | Yes | Yes |

Table F-1. Summary of $SO_2$ Sources Included in the Air Modeling Analysis

| AIRS Number | Facility | Units | Modeling ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Diameter (m) | Temper. (K) | Velocity (m/s) | Emission Rate(g/s) 3-Hour | 24-Hour | PSD Source? (EXP/CON) | Modeled in AAQS | Class II | Class I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Off-crop season future | | | | | | | | | | | | | |
| | | Unit 1 | USSBRL1F | -38,300 | -10,500 | 65.0 | 2.44 | 347.0 | 14.05 | 51.64 | 24.29 | CON | Yes | Yes | Yes |
| | | Unit 2 | USSBLR2F | -38,300 | -10,500 | 65.0 | 2.44 | 338.0 | 12.68 | 51.27 | 24.02 | CON | Yes | Yes | Yes |
| | | Unit 3 | USSBLR3F | -38,300 | -10,500 | 65.0 | 2.44 | 333.2 | 6.20 | 30.74 | 30.20 | CON | Yes | Yes | Yes |
| | | Unit 4 | USSBLR4F | -38,300 | -10,500 | 45.7 | 2.51 | 344.3 | 0.00 | 0.00 | 0.00 | CON | Yes | Yes | Yes |
| | | Unit 7 | USSBLR7F | -38,300 | -10,500 | 68.6 | 2.59 | 405.4 | 23.60 | 17.39 | 15.81 | CON | Yes | Yes | Yes |
| 0990234 | Palm Beach Co. Resource Recovery | | | | | | | | | | | | | | |
| | | 1&2 PSD | PBCRRF | 41,400 | -7,200 | 76.2 | 2.04 | 505.2 | 24.90 | 85.05 | 85.05 | CON | Yes | Yes | Yes |
| 0990042 | FPL Riviera[c] | | | | | | | | | | | | | | |
| | | Units 3&4 at 2.5%s fuel oil | RIVU34 | 49,800 | -6,800 | 90.8 | 4.88 | 401.5 | 18.90 | 2113.65 | 2113.65 | NO | Yes | No | No |
| 0990568 | Lake Worth Utilities[c] | | | | | | | | | | | | | | |
| | | Unit 3 | LAKWTHU3 | 48,400 | -23,700 | 38.1 | 2.13 | 408.2 | 7.71 | 103.95 | 103.95 | NO | Yes | No | No |
| | | Unit 4 | LAKWTHU4 | 48,400 | -23,700 | 35.1 | 2.29 | 418.2 | 17.00 | 129.85 | 129.85 | NO | Yes | No | No |
| | | Unit 5 | LAKWTHU5 | 48,400 | -23,700 | 22.9 | 0.94 | 450.4 | 18.29 | 11.59 | 11.59 | NO | Yes | No | No |
| | | HRSG | LAKWTHHR | 48,400 | -23,700 | 45.7 | 5.49 | 377.6 | 13.74 | 12.79 | 12.79 | CON | Yes | Yes | Yes |
| 1110003 | Fort Pierce Utilities [c] | | | | | | | | | | | | | | |
| | | Units 6&7 | FTPIER67 | 22,400 | 68,900 | 45.7 | 2.19 | 408.2 | 12.50 | 77.87 | 77.87 | NO | Yes | No | No |
| 0610029 | Vero Beach Power[c] | | | | | | | | | | | | | | |
| | | Unit 1 | VERBU1 | 22,700 | 89,100 | 60.96 | 1.07 | 437.0 | 32.42 | 28.77 | 28.77 | NO | Yes | No | No |
| | | Unit 2 | VERBU2 | 22,700 | 89,100 | 60.96 | 1.07 | 434.3 | 37.57 | 84.21 | 84.21 | NO | Yes | No | No |
| | | Unit 3 | VERBU3 | 22,700 | 89,100 | 60.96 | 1.83 | 440.4 | 19.93 | 142.07 | 142.07 | NO | Yes | No | No |
| | | Unit 4 | VERBU4 | 22,700 | 89,100 | 60.96 | 2.13 | 425.4 | 24.36 | 69.05 | 69.05 | NO | Yes | No | No |
| | | Unit 5 Simple Cycle CT | VERBU5 | 22,700 | 89,100 | 38.10 | 3.35 | 416.5 | 19.56 | 15.50 | 15.50 | CON | Yes | Yes | No |
| 0112119 | South Broward RRF PSD [c] | | SBCRRF | 35,200 | -84,100 | 59.4 | 3.96 | 381.0 | 18.01 | 37.91 | 37.91 | CON | Yes | Yes | Yes |
| 0110037 | FPL - Lauderdale [c] | | | | | | | | | | | | | | |
| | | CTs 1-4 PSD | LAUDU45 | 35,700 | -84,100 | 45.7 | 5.49 | 438.7 | 14.60 | 271.15 | 271.15 | CON | Yes | Yes | Yes |
| | | GT 1-12 (0.5% fuel oil) | LDGT1_12 | 35,700 | -84,100 | 13.7 | 2.37 | 733.2 | 114.31 | 552.80 | 552.80 | NO | Yes | No | No |
| | | GT 13-24 (0.5% fuel oil) | LDGT1324 | 35,700 | -84,100 | 13.4 | 4.75 | 733.2 | 28.43 | 552.80 | 552.80 | NO | Yes | No | No |
| | | 4&5 PSD Baseline | FTLAU45B | 35,700 | -84,100 | 46.0 | 4.27 | 422.0 | 14.63 | -457.00 | -457.00 | EXP | No | Yes | Yes |

Table F-1. Summary of $SO_2$ Sources Included in the Air Modeling Analysis

| AIRS Number | Facility | Units | Modeling ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Diameter (m) | Temper. (K) | Velocity (m/s) | Emission Rate(g/s) 3-Hour | Emission Rate(g/s) 24-Hour | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II | Modeled in Class I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0110036 | FPL Port Everglades [c] | | | | | | | | | | | | | | |
| | | Units 1&2 at 2.5%s fuel oil | PTEVU12 | 43,000 | -82,100 | 104.5 | 4.27 | 415.9 | 26.72 | 1593.90 | 1593.90 | NO | Yes | No | No |
| | | Units 3&4 at 2.5%s fuel oil | PTEVU34 | 43,000 | -82,100 | 104.5 | 5.52 | 414.8 | 23.88 | 2772.00 | 2772.00 | NO | Yes | No | No |
| | | GT 1-12 (0.5% fuel oil) | PTEVGTS | 43,000 | -82,100 | 13.4 | 4.75 | 733.2 | 28.43 | 530.70 | 530.70 | NO | Yes | No | No |
| 0550018 | TECO-Phillips [c] | | | | | | | | | | | | | | |
| | | Steam Boiler | TECOSB | -80,100 | 68,000 | 18.90 | 0.67 | ND | ND | 0.7 | 0.7 | NO | No | No | No |
| | | Diesel Generator Unit 1 | TECO1 | -80,100 | 68,000 | 45.72 | 1.83 | 441.0 | 24.1 | 58.0 | 29.0 | NO | Yes | No | No |
| | | Diesel Generator Unit 2 | TECO2 | -80,100 | 68,000 | 45.72 | 1.83 | 450.0 | 24.1 | 58.0 | 29.0 | NO | Yes | No | No |
| 0250020 | Tarmac [c] | | | | | | | | | | | | | | |
| | | Kiln 1 PSD Baseline | TARMC1 | 18,500 | -105,700 | 61.0 | 2.44 | 465.0 | 12.84 | -5.71 | -5.71 | EXP | No | Yes | Yes |
| | | Kiln 2 PSD Baseline | TARMC2B | 18,500 | -105,700 | 61.0 | 2.44 | 465.0 | 12.84 | -5.71 | -5.71 | EXP | No | Yes | Yes |
| | | Kiln 3 PSD Baseline | TARMC3B | 18,500 | -105,700 | 61.0 | 4.57 | 472.0 | 10.78 | -2.76 | -2.76 | EXP | No | Yes | Yes |
| | | Kiln 2 PSD | TABMC2P | 18,500 | -105,700 | 61.0 | 2.44 | 422.0 | 9.10 | 24.57 | 24.57 | CON | Yes | Yes | Yes |
| | | Kiln 3 PSD | TARMC3P | 18,500 | -105,700 | 61.0 | 4.57 | 450.0 | 11.04 | 51.43 | 51.43 | CON | Yes | Yes | Yes |
| 0550004 | TECO-Sebring/Dinner Lake [c] | | | | | | | | | | | | | | |
| | | Steam Boiler | DINNSB | -87,600 | 75,100 | 22.9 | 1.83 | 394.3 | 5.79 | 37.78 | 37.78 | CON | Yes | Yes | No |
| 0710000 | FPL Fort Myers [c] | | | | | | | | | | | | | | |
| | | Unit 1 PSD | FMU1 | -122,300 | -14,500 | 91.8 | 2.90 | 422.0 | 29.90 | -585.50 | -585.50 | EXP | No | Yes | Yes |
| | | Unit 2 PSD | FMU2 | -122,300 | -14,500 | 121.2 | 5.52 | 408.0 | 19.20 | -1334 | -1334.0 | EXP | No | Yes | Yes |
| | | HRSGs 1 - 6 | FMYHR1_6 | -122,300 | -14,500 | 38.1 | 5.79 | 377.6 | 14.2 | 3.86 | 3.9 | CON | Yes | Yes | Yes |
| | | Gas Turbines 1 -12 | FMYGT112 | -122,300 | -14,500 | 9.75 | 4.42 | 797.0 | 35.7 | 649.2 | 649.2 | NO | Yes | No | No |
| 0250348 | Dade County RRF PSD | | | | | | | | | | | | | | |
| | | Units 1&2 | DCRRF12 | 19,900 | -110,000 | 76.2 | 3.66 | 405.4 | 15.86 | 26.41 | 12.32 | CON | No [e] | No [e] | Yes |
| | | Units 3&4 | DCRRF34 | 19,900 | -110,000 | 76.2 | 3.66 | 405.4 | 15.86 | 26.41 | 12.32 | CON | No [e] | No [e] | Yes |
| 0112515 | Enron Pompano Beach Energy Center | | | | | | | | | | | | | | |
| | | 3-170 MW CTs | ENPMPCT | 39,300 | -61,900 | 24.4 | 5.49 | 847.0 | 47.06 | 39.16 | 39.16 | CON | No [e] | No [e] | Yes |
| 0110120 | North Broward RRF PSD | | NBCRRF | 39,200 | -59,800 | 58.5 | 3.96 | 381.0 | 18.01 | 35.40 | 35.40 | CON | No [e] | No [e] | Yes |
| 0112534 | Enron Deerfield Beach Energy Center | | | | | | | | | | | | | | |
| | | 3-170 MW CTs | ENDFCT | 38,700 | -59,500 | 24.4 | 5.49 | 847.0 | 47.06 | 39.16 | 39.16 | CON | No [e] | No [e] | Yes |

Table F-1. Summary of $SO_2$ Sources Included in the Air Modeling Analysis

| AIRS Number | Facility | Units | Modeling ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Diameter (m) | Temper. (K) | Velocity (m/s) | Emission Rate(g/s) 3-Hour | 24-Hour | PSD Source? (EXP/CON) | Modeled in AAQS | Class II | Class I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0112545 | El Paso Broward | | | | | | | | | | | | | | |
| | | Combined Cycle CT CC-1 | EPBRCT1 | 38,900 | -59,400 | 41.1 | 5.79 | 359.3 | 61.13 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| | | Simple Cycle SC-1 | EPBRSC1 | 38,900 | -59,400 | 41.1 | 5.79 | 862.0 | 146.96 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| | | Simple Cycle SC-2 | EPBRSC2 | 38,900 | -59,400 | 41.1 | 5.79 | 862.0 | 146.96 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| | | Simple Cycle SC-3 | EPBRSC3 | 38,900 | -59,400 | 41.1 | 5.79 | 862.0 | 146.96 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| 0710019 | Lee County RRF PSD | | LEECORRF | -120,200 | -21,700 | 83.8 | 1.88 | 388.5 | 19.81 | 14.00 | 14.00 | CON | No [e] | No [e] | Yes |
| 0990332 | New Hope Power Partnership (Okeelanta) | | | | | | | | | | | | | | |
| | | Okeelanta Power Blrs 1,2,3 [b] | OKCOGENF | -20,300 | -27,400 | 60.7 | 3.05 | 450.9 | 19.39 | 54.1 | 54.1 | CON | No [e] | No [e] | Yes |
| 0990005 | Okeelanta [a] | | | | | | | | | | | | | | |
| | | Boiler 4 PSD Baseline | OKBLR4B | -19,400 | -30,000 | 22.9 | 2.29 | 333.0 | 7.36 | -10.95 | -10.95 | EXP | No [e] | No [e] | Yes |
| | | Boiler 5 PSD Baseline | OKBLR5B | -19,400 | -30,000 | 22.9 | 2.29 | 333.0 | 12.07 | -15.64 | -15.64 | EXP | No [e] | No [e] | Yes |
| | | Boiler 6 PSD Baseline | OKBLR6B | -19,400 | -30,000 | 22.9 | 2.29 | 334.0 | 8.74 | -15.64 | -15.64 | EXP | No [e] | No [e] | Yes |
| | | Boiler 10 PSD Baseline | OKBLR10B | -19,400 | -30,000 | 22.9 | 2.29 | 334.0 | 10.35 | -17.15 | -17.15 | EXP | No [e] | No [e] | Yes |
| | | Boiler 11 PSD Baseline | OKBLR11B | -19,400 | -30,000 | 22.9 | 2.29 | 342.0 | 9.89 | -16.79 | -16.79 | EXP | No [e] | No [e] | Yes |
| | | Boiler 16 PSD | OKBLR16 | -19,400 | -30,000 | 22.9 | 1.52 | 483.0 | 22.86 | 1.47 | 1.47 | CON | No [e] | No [e] | Yes |
| 0990568 | Lake Worth Generating | | | | | | | | | | | | | | |
| | | 4-GE Frame 7FA CTs & HRSG | LWGENCT | 48,400 | -23,700 | 45.7 | 5.49 | 377.6 | 24.29 | 51.16 | 51.16 | CON | No [e] | No [e] | Yes |
| 0990594 | El Paso Belle Glade | | | | | | | | | | | | | | |
| | | Combined Cycle CT CC-1 | EPBGLCT | -10,900 | -13,300 | 41.1 | 5.79 | 359.3 | 61.13 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| | | Simple Cycle SC-1 | EPBGSC1 | -10,900 | -13,300 | 41.1 | 5.79 | 862.0 | 146.96 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| | | Simple Cycle SC-2 | EPBGSC2 | -10,900 | -13,300 | 41.1 | 5.79 | 862.0 | 146.96 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| | | Simple Cycle SC-3 | EPBGSC3 | -10,900 | -13,300 | 41.1 | 5.79 | 862.0 | 146.96 | 0.46 | 0.46 | CON | No [e] | No [e] | Yes |
| 0510015 | Southern Gardens Citrus - PSD | | | | | | | | | | | | | | |
| | | Peel Dryer | SGARDDRY | -57 | -10 | 38.1 | 1.73 | 316.0 | 7.45 | 5.29 | 5.29 | CON | No [e] | No [e] | Yes |
| | | Boilers 1-3 | SGARDBLR | -57 | -10 | 16.8 | 1.22 | 478.0 | 14.22 | 6.88 | 6.88 | CON | No [e] | No [e] | Yes |

Table F-1. Summary of $SO_2$ Sources Included in the Air Modeling Analysis

| AIRS Number | Facility | Units | Modeling ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Stack and Operating Parameters Diameter (m) | Stack and Operating Parameters Temper. (K) | Stack and Operating Parameters Velocity (m/s) | Emission Rate(g/s) 3-Hour | Emission Rate(g/s) 24-Hour | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II | Modeled in Class I |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Note:
EXP = PSD expanding source
CON = PSD consuming source
NO = Source does not affect PSD increment
ND = No data available

[a] Facilities or sources within facilities that operate only during the October 1 through April 31 crop season.

[b] Sugar mill sources that operate all year.

[c] Large source with emissions greater than 1,000 TPY included in the AAQS or PSD Class II modeling even though the source is located outside of the screening area.

[d] Represents worst case emissions for May 1 through September 31 off-crop season operation, and October 1-April 30 for on-crop season. Updated from PSD modeling information, Golder Associates (7/18/00). Baseline data represents November 1 though April 30.

[e] Not included in AAQS or Class II modeling analyses because they screened out.

Table F-2. Summary of PM Sources Included in the Air Modeling Analysis for Simultaneous Operations

| AIRS Number | Facility | Units | ISCST3 ID Name | Relative Location X (m) | Relative Location Y (m) | Stack Parameters Height (m) | Stack Parameters Diameter (m) | Stack Parameters Temper. (K) | Stack Parameters Velocity (m/s) | Emission Rate lb/hr | Emission Rate g/s | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990019 | Osceola Farms PSD Baseline [a] | | | | | | | | | | | | | |
| | | Unit 1 PSD Baseline | OSBLR1B | -165 | 36 | 22.0 | 1.52 | 342.0 | 8.98 | -26.83 | -3.38 | EXP | No | Yes |
| | | Unit 2 PSD Baseline | OSBLR2B | 164 | -50 | 22.0 | 1.52 | 342.0 | 14.22 | -59.68 | -7.52 | EXP | No | Yes |
| | | Unit 3 PSD Baseline | OSBLR3B | 165 | -36 | 22.0 | 1.93 | 342.0 | 11.23 | -31.98 | -4.03 | EXP | No | Yes |
| | | Unit 4 PSD Baseline | OSBLR4B | 153 | -23 | 22.0 | 1.83 | 342.0 | 13.35 | -47.70 | -6.01 | EXP | No | Yes |
| 990061 | US Sugar-Bryant [a] | | | | | | | | | | | | | |
| | | Unit 5 PSD | USSBRY5 | -6,600 | 1,700 | 42.7 | 2.90 | 345.0 | 11.49 | 99.92 | 12.59 | CON | Yes | Yes |
| | | Unit 1,2&3 | USBRY123 | -6,600 | 1,700 | 19.8 | 1.64 | 342.0 | 36.40 | 346.51 | 43.66 | CON | Yes | Yes |
| | | Unit 1 PSD Baseline | USSBRY1B | -6,600 | 1,700 | 19.8 | 1.68 | 494.0 | 44.30 | -653.97 | -82.40 | EXP | No | Yes |
| | | Unit 2&3 PSD Baseline | USBRY23B | -6,600 | 1,700 | 19.8 | 1.68 | 344.0 | 37.90 | -95.56 | -12.04 | EXP | No | Yes |
| 990026 | Sugar Cane Growers [a] | | | | | | | | | | | | | |
| | | Unit 1&2 | SUGCN12 | -9,500 | -14,100 | 45.7 | 1.87 | 339.0 | 21.75 | 51.51 | 6.49 | CON | Yes | Yes |
| | | Unit 3 | SUGCN3 | -9,500 | -14,100 | 27.4 | 1.52 | 339.0 | 22.25 | 102.78 | 12.95 | CON | Yes | Yes |
| | | Unit 4 PSD | SUGCN4 | -9,500 | -14,100 | 54.9 | 2.44 | 339.0 | 21.73 | 98.81 | 12.45 | CON | Yes | Yes |
| | | Unit 5 | SUGCN5 | -9,500 | -14,100 | 45.7 | 2.30 | 339.0 | 15.94 | 98.81 | 12.45 | CON | Yes | Yes |
| | | Unit 8 PSD | SUGCN8 | -9,500 | -14,100 | 47.2 | 2.90 | 339.0 | 13.62 | 68.02 | 8.57 | CON | Yes | Yes |
| | | Unit 1&2 PSD Baseline | SUGCN12B | -9,500 | -14,100 | 24.4 | 1.40 | 344.0 | 11.40 | -107.94 | -13.60 | EXP | No | Yes |
| | | Unit 3 PSD Baseline | SUGCN3B | -9,500 | -14,100 | 24.4 | 1.60 | 344.0 | 15.60 | -45.24 | -5.70 | EXP | No | Yes |
| | | Unit 4 PSD Baseline | SUGCN4B | -9,500 | -14,100 | 25.9 | 1.63 | 344.0 | 11.20 | -86.51 | -10.90 | EXP | No | Yes |
| | | Unit 5 PSD Baseline | SUGCN5B | -9,500 | -14,100 | 24.4 | 1.40 | 344.0 | 15.20 | -72.22 | -9.10 | EXP | No | Yes |
| | | Unit 6&7 PSD Baseline | SUGCN67B | -9,500 | -14,100 | 12.2 | 1.52 | 606.0 | 11.20 | -19.84 | -2.50 | EXP | No | Yes |
| 0990016 | Atlantic Sugar Association [a] | | | | | | | | | | | | | |
| | | Unit 1 | ASA1 | 8,500 | -22,200 | 27.4 | 1.83 | 346.0 | 17.97 | 83.97 | 10.58 | CON | Yes | Yes |
| | | Unit 2 | ASA2 | 8,500 | -22,200 | 27.4 | 1.83 | 350.0 | 23.36 | 83.97 | 10.58 | CON | Yes | Yes |
| | | Unit 3 | ASA3 | 8,500 | -22,200 | 27.4 | 1.83 | 350.0 | 21.56 | 78.02 | 9.83 | CON | Yes | Yes |
| | | Unit 4 | ASA4 | 8,500 | -22,200 | 27.4 | 1.83 | 344.0 | 25.16 | 79.76 | 10.05 | CON | Yes | Yes |
| | | Unit 5 PSD | ASA5 | 8,500 | -22,200 | 27.4 | 1.68 | 339.0 | 19.24 | 35.71 | 4.50 | CON | Yes | Yes |
| | | Unit 1 PSD Baseline | ASA1B | 8,500 | -22,200 | 18.9 | 1.92 | 506.0 | 12.71 | -116.98 | -14.74 | EXP | No | Yes |
| | | Unit 2 PSD Baseline | ASA2B | 8,500 | -22,200 | 18.9 | 1.92 | 511.0 | 10.89 | -141.98 | -17.89 | EXP | No | Yes |
| | | Unit 3 PSD Baseline | ASA3B | 8,500 | -22,200 | 21.9 | 1.83 | 522.0 | 17.52 | -73.97 | -9.32 | EXP | No | Yes |
| | | Unit 4 PSD Baseline | ASA4B | 8,500 | -22,200 | 18.3 | 1.83 | 344.0 | 15.03 | -73.41 | -9.25 | EXP | No | Yes |
| 850001 | FPL -Martin | | | | | | | | | | | | | |

Table F-2. Summary of PM Sources Included in the Air Modeling Analysis for Simultaneous Operations

| AIRS Number | Facility | Units | ISCST3 ID Name | Relative Location X (m) | Relative Location Y (m) | Stack Parameters Height (m) | Stack Parameters Diameter (m) | Stack Parameters Temper. (K) | Stack Parameters Velocity (m/s) | Emission Rate lb/hr | Emission Rate g/s | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Units 1&2 | MART12 | -21,000 | -12,200 | 152.1 | 7.99 | 420.9 | 21.03 | 1,730.16 | 218.00 | CON | Yes | No |
| | | Aux Blr PSD | MARTAUX | -21,000 | -12,200 | 18.3 | 1.10 | 535.4 | 15.24 | 0.10 | 0.01 | CON | Yes | Yes |
| | | Diesel Gens PSD | MARTGEN | -21,000 | -12,200 | 7.6 | 0.30 | 785.9 | 39.62 | 1.72 | 0.22 | CON | Yes | Yes |
| | | Units 3&4 PSD | MART34 | -21,000 | -12,200 | 64.9 | 6.10 | 410.9 | 18.90 | 242.40 | 30.54 | CON | Yes | Yes |
| 510003 | US Sugar - Clewiston [b] | | | | | | | | | | | | | |
| | | PSD Baseline (On-crop season only) | | | | | | | | | | | | |
| | | Unit 1 PSD Baseline | USSBRL1B | -34,800 | -13,200 | 23.1 | 1.86 | 344.0 | 30.20 | -59.37 | -7.48 | EXP | No | Yes |
| | | Unit 2 PSD Baseline | USSBLR2B | -34,800 | -13,200 | 23.1 | 1.86 | 343.0 | 35.70 | -55.87 | -7.04 | EXP | No | Yes |
| | | Unit 3 PSD Baseline | USSBLR3B | -34,800 | -13,200 | 27.4 | 2.29 | 342.0 | 14.70 | -36.27 | -4.57 | EXP | No | Yes |
| | | East Pellet Plant PSD Baseline | EPELLET | -34,800 | -13,200 | 12.2 | 1.52 | 347.0 | 8.54 | -13.41 | -1.69 | EXP | No | Yes |
| | | West Pellet Plant PSD Baseline | WPELLET | -34,800 | -13,200 | 15.7 | 1.52 | 347.0 | 8.54 | -6.51 | -0.82 | EXP | No | Yes |
| | | Units 5&6 PSD Baseline | USBLR56B | -34,800 | -13,200 | 23.1 | 1.86 | 494.0 | 44.30 | -420.00 | -52.92 | EXP | No | Yes |
| | | Off-crop season future | | | | | | | | | | | | |
| | | Unit 1 | USSBLR1F | -34,800 | -13,200 | 65.0 | 2.44 | 347.0 | 12.05 | 72.30 | 9.11 | CON | Yes | Yes |
| | | Unit 2 | USSBLR2F | -34,800 | -13,200 | 65.0 | 2.44 | 338.7 | 12.05 | 72.30 | 9.11 | CON | Yes | Yes |
| | | Unit 3 | USSBLR3F | -34,800 | -13,200 | 65.0 | 2.44 | 333.2 | 8.47 | 74.05 | 9.33 | CON | Yes | Yes |
| | | Unit 4 | USSBLR4F | -34,800 | -13,200 | 45.7 | 2.51 | 344.3 | 0.00 | 0.00 | 0.00 | CON | Yes | Yes |
| | | Unit 7 | USSBLR7F | -34,800 | -13,200 | 68.6 | 2.59 | 405.4 | 23.60 | 22.14 | 2.79 | CON | Yes | Yes |
| | | On-crop season future | | | | | | | | | | | | |
| | | Unit 1 | USSBLR1N | -34,800 | -13,200 | 65.0 | 2.44 | 347.0 | 19.20 | 115.24 | 14.52 | CON | Yes | Yes |
| | | Unit 2 | USSBLR2N | -34,800 | -13,200 | 65.0 | 2.44 | 338.7 | 17.32 | 103.89 | 13.09 | CON | Yes | Yes |
| | | Unit 3 | USSBLR3N | -34,800 | -13,200 | 65.0 | 2.44 | 333.2 | 8.47 | 74.05 | 9.33 | CON | Yes | Yes |
| | | Unit 4 | USSBLR4N | -34,800 | -13,200 | 45.7 | 2.51 | 344.3 | 24.03 | 83.73 | 10.55 | CON | Yes | Yes |
| | | Unit 7 | USSBLR7N | -34,800 | -13,200 | 68.6 | 2.59 | 405.4 | 23.60 | 22.14 | 2.79 | CON | Yes | Yes |
| 500042 | FPL - Riveria Beach [c] | | | | | | | | | | | | | |
| | | Units 3 and 4 at 2.5% S Fuel Oil | RIVU34 | 30,800 | 39,400 | 90.8 | 4.88 | 401.5 | 18.90 | 762.54 | 96.08 | NO | Yes | No |
| 0060036 | FPL - Port Everglades [c] | | | | | | | | | | | | | |
| | | Unit 1 | EVERG1 | 22,400 | 68,900 | 104.9 | 4.27 | 408.0 | 18.29 | 240.00 | 30.24 | NO | Yes | No |
| | | Unit 2 | EVERG2 | 22,400 | 68,900 | 104.9 | 4.27 | 416.0 | 4.88 | 240.00 | 30.24 | NO | Yes | No |
| | | Unit 3 | EVERG3 | 22,400 | 68,900 | 104.9 | 5.52 | 408.0 | 19.20 | 418.00 | 52.67 | NO | Yes | No |

Table F-2. Summary of PM Sources Included in the Air Modeling Analysis for Simultaneous Operations

| AIRS Number | Facility | Units | ISCST3 ID Name | Relative Location X (m) | Relative Location Y (m) | Stack Parameters Height (m) | Stack Parameters Diameter (m) | Stack Parameters Temper. (K) | Stack Parameters Velocity (m/s) | Emission Rate lb/hr | Emission Rate g/s | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Unit 4 | EVERG4 | 22,400 | 68,900 | 104.9 | 5.52 | 408.0 | 19.20 | 418.00 | 52.67 | NO | Yes | No |
| | | 12 CTs, Simple Cycle | EVERCTS | 22,400 | 68,900 | 13.4 | 4.75 | 683.0 | 10.67 | 726.00 | 91.48 | NO | Yes | No |
| 710002 | FPL - Fort Myers [c] | | | | | | | | | | | | | |
| | | Unit 1 PSD | FMU1 | 43,000 | -82,100 | 91.8 | 2.90 | 422.0 | 29.90 | -169.05 | -21.30 | EXP | No | Yes |
| | | Unit 2 PSD | FMU2 | 43,000 | -82,100 | 121.2 | 5.52 | 408.0 | 19.20 | -384.92 | -48.50 | EXP | No | Yes |
| | | HRSGs 1 - 6 | FMYCT1_6 | 43,000 | -82,100 | 228.6 | 5.79 | 377.6 | 14.2 | 60.00 | 7.56 | CON | Yes | Yes |
| | | Gas Turbines 1 -12 | FMYGT112 | 43,000 | -82,100 | 117.00 | 4.42 | 797.0 | 35.7 | 299.05 | 37.68 | CON | Yes | Yes |
| | | Colling Towers 1 - 12 | FMYCT112 | 43,000 | -82,100 | 164.64 | 9.75 | 304.3 | 7.59 | 12.78 | 1.61 | CON | Yes | Yes |

[a] Facilities or sources within facilities that operate only during the November 1 through April 30 crop season.

[b] Future data represents worst case emissions for May 1 through September 31 off-crop season operation, and October 1-April 30 for on-crop season. Updated from PSD modeling information, Golder Associates (7/18/00). Baseline data represents November 1 through April 30.

[c] Large source (> 1,000 TPY) outside screening area but included in modeling analysis.

Note: EXP = PSD expanding source
CON = PSD consuming source
NO = Source does not effect PSD increment.

Table F-3 Summary of $NO_x$ Sources Included in the Air Modeling Analysis for Simultaneous Operation

| AIRS Number | Facility | Units | EU # | ISCST3 ID Name | Relative Location [c] X (m) | Relative Location [c] Y (m) | Stack Parameters Height (m) | Stack Parameters Diameter (m) | Stack Parameters Temper. (K) | Stack Parameters Velocity (m/s) | Emission Rate TPY | Emission Rate g/s | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990019 | OSCEOLA FARMS PSD Baseline [a] | | | | | | | | | | | | | | |
| | | BOILER #2 PSD Baseline | 2 | OSBLR2B | 164 | -50 | 22.00 | 1.52 | 342.0 | 18.10 | -37.6 | -1.88 | EXP | No | Yes |
| | | BOILER #3 PSD Baseline | 3 | OSBLR3B | 165 | -36 | 22.00 | 1.93 | 341.0 | 14.50 | -16.9 | -0.84 | EXP | No | Yes |
| | | BOILER #4 PSD Baseline | 4 | OSBLR4B | 153 | -23 | 22.00 | 1.83 | 341.0 | 18.80 | -30.4 | -1.52 | EXP | No | Yes |
| | | BOILER #5 PSD Baseline | 5 | OSBLR5B | 150 | -6 | 22.00 | 1.52 | 342.0 | 12.12 | -38.3 | -4.83 | EXP | No | Yes |
| | | BOILER #6 PSD Baseline | 6 | OSBLR6B | 131 | -39 | 27.43 | 1.93 | 341.5 | 17.07 | -39.9 | -2.00 | EXP | No | Yes |
| 0990061 | U.S. Sugar, Bryant [a] | BOILERS #s 1, 2, & 3 | | USBRY123 | -6,600 | 1,720 | 19.81 | 1.65 | 344.3 | 26.52 | 1,060.2 | 65.49 | NO | Yes | No |
| | | BOILER #5 | 5 | USBRY5 | -6,600 | 1,720 | 42.67 | 2.90 | 345.4 | 17.07 | 384.2 | 20.37 | NO | Yes | No |
| | | DIESEL ELECTRIC GENERATOR #1 | 7 | USBRY7 | -6,600 | 1,720 | 8.53 | 0.37 | 519.3 | 12.19 | 262.0 | 7.54 | NO | Yes | No |
| | | DIESEL ELECTRIC GENERATOR #2 | 8 | USBRY8 | -6,600 | 1,720 | 8.53 | 0.37 | 519.3 | 12.80 | 278.0 | 7.99 | NO | Yes | No |
| 0990026 | SUGAR CANE GROWERS [a] | BOILER #1 & #2 | | SUGCN12 | -9,500 | -14,100 | 45.72 | 1.87 | 339.0 | 21.75 | 1,096.8 | 37.88 | CON | Yes | Yes |
| | | BOILER #3 | 3 | SUGCN3 | -9,500 | -14,100 | 27.43 | 1.52 | 339.0 | 22.25 | 227.2 | 12.96 | CON | Yes | Yes |
| | | BOILER #4 | 4 | SUGCN4 | -9,500 | -14,100 | 54.90 | 2.44 | 339.0 | 21.73 | 938.5 | 32.41 | CON | Yes | Yes |
| | | BOILER #5 | 5 | SUGCN5 | -9,500 | -14,100 | 45.72 | 2.30 | 339.0 | 15.94 | 720.8 | 24.90 | CON | Yes | Yes |
| | | BOILER # 8 | 8 | SUGCN8 | -9,500 | -14,100 | 47.24 | 2.90 | 339.0 | 13.62 | 449.0 | 15.50 | CON | Yes | Yes |
| | | BOILER #1 & #2 PSD Baseline | | SUGCN12B | -9,500 | -14,100 | 24.40 | 1.32 | 344.0 | 16.90 | -68.0 | -3.40 | EXP | No | Yes |
| | | BOILER #3 PSD Baseline | 3 | SUGCN3B | -9,500 | -14,100 | 24.40 | 1.60 | 344.0 | 15.60 | -41.6 | -2.08 | EXP | No | Yes |
| | | BOILER #4 PSD Baseline | 4 | SUGCN4B | -9,500 | -14,100 | 25.90 | 2.82 | 344.0 | 10.60 | -77.7 | -3.88 | EXP | No | Yes |
| | | BOILER #5 PSD Baseline | 5 | SUGCN5B | -9,500 | -14,100 | 24.40 | 1.40 | 344.0 | 15.20 | -51.8 | -2.59 | EXP | No | Yes |
| | | BOILER #8 PSD Baseline | 8 | SUGCN8B | -9,500 | -14,100 | 47.24 | 2.90 | 339.0 | 13.62 | -78.5 | -2.26 | EXP | No | Yes |
| 0990594 | El Paso Belle Glade Generating Station | | | | | | | | | | | | | | |
| | | Combined Cycle CT, CC-1 | 1 | EPBGCT1 | -10,900 | -13,300 | 41.15 | 5.79 | 359.3 | 18.63 | 71.7 | 2.06 | CON | Yes | Yes |
| | | 2 Simple Cycle CTs, SC-1 and SC-2 | 23 | EPBGSC23 | -10,900 | -13,300 | 41.15 | 5.79 | 862.0 | 44.79 | 292.8 | 8.43 | CON | Yes | Yes |
| 0990021 | United Technologies Corporation/Pratt& Whitney | | | | | | | | | | | | | | |
| | | Air compressor/heater (ACHR-2-B2); slave jet engine | 1 | UTECH1 | 17,600 | 8,600 | 15.24 | 0.91 | 810.9 | 143.73 | 572.3 | 16.48 | CON | Yes | Yes |
| | | Boiler (BO-12-E6) w/heat input of 42 mmBTUH in Test Area E | 16 | UTECH16 | 17,600 | 8,600 | 4.57 | 0.76 | 533.0 | 6.92 | 26.3 | 0.76 | NO | Yes | No |
| | | 2 boilers (BO-1-MBH,BO-2-BMH); 54 MMBTUH each | 22 | UTECH22 | 17,600 | 8,600 | 20.12 | 2.32 | 671.9 | 10.19 | 63.7 | 1.83 | CON | Yes | Yes |
| | | Two furnaces (FU-3-MHT, FU-4-MHT), 6 MMBTUH each | 40 | UTECH40 | 17,600 | 8,600 | 14.90 | 1.20 | 298.2 | 0.04 | 5.1 | 0.15 | CON | Yes | Yes |
| | | Water evaporator (EV-1-MW) w/heat input of 0.2 MMBTUH | 45 | UTECH45 | 17,600 | 8,600 | 3.70 | 0.20 | 298.2 | 2.60 | 0.1 | 0.0024 | CON | Yes | Yes |
| | | Miscellaneous air and fuel heaters fired with natural gas | 59 | UTECH59 | 17,600 | 8,600 | 6.10 | 0.50 | 533.2 | 4.90 | 31.8 | 0.91 | CON | Yes | Yes |
| | | Boiler (BO-14-E8) w/heat input of 7 MMBTUH | 66 | UTECH66 | 17,600 | 8,600 | 7.32 | 0.41 | 513.6 | 33.17 | 4.5 | 0.13 | CON | Yes | Yes |
| | | Boiler (BO-3-MDL) w/heat input of 1 MMBTUH | 67 | UTECH67 | 17,600 | 8,600 | 7.32 | 0.30 | 513.6 | 0.32 | 0.6 | 0.017 | CON | Yes | Yes |
| | | Emergency electrical generating facility | 68 | UTECH68 | 17,600 | 8,600 | 3.70 | 0.20 | 922.0 | 151.40 | 233.5 | 6.72 | NO | Yes | No |
| | | Ten existing jet engine test stands located in Test Area | 69 | UTECH69 | 17,600 | 8,600 | 5.50 | 3.70 | 422.0 | 0.08 | 813.6 | 23.43 | NO | Yes | No |
| | | A-10 Test Stand | | UTECHA10 | 17,600 | 8,600 | 5.79 | 4.17 | 410.9 | 106.68 | 39.0 | 1.12 | NO | Yes | No |
| 0850102 | Bechtel Indiantown | Pulverized Coal Main Boiler | 1 | INDTWN1 | 1,200 | 24,100 | 150.88 | 4.88 | 333.2 | 28.41 | 2,549.0 | 73.33 | CON | Yes | Yes |
| | | (2) Auxiliary Boilers | 3 | INDTWN3 | 1,200 | 24,100 | 64.01 | 1.52 | 449.8 | 26.70 | 34.0 | 9.02 | CON | Yes | Yes |
| 0990016 | ATLANTIC SUGAR ASSOCIATION [a] | BOILER #1 | 1 | ATLSUG1 | 8,500 | -22,200 | 27.43 | 1.89 | 344.3 | 16.82 | 550.4 | 31.75 | NO | Yes | No |
| | | BOILER #2 | 2 | ATLSUG2 | 8,500 | -22,200 | 27.43 | 1.89 | 344.3 | 12.50 | 550.4 | 31.75 | NO | Yes | No |
| | | BOILER #3 | 3 | ATLSUG3 | 8,500 | -22,200 | 18.29 | 1.83 | 338.7 | 16.15 | 512.5 | 14.74 | NO | Yes | No |
| | | BOILER # 4 | 4 | ATLSUG4 | 8,500 | -22,200 | 27.43 | 1.83 | 338.7 | 16.15 | 542.0 | 15.59 | NO | Yes | No |
| | | BOILER # 5 [b] | 5 | ATLSUG5 | 8,500 | -22,200 | 27.43 | 1.68 | 338.7 | 19.20 | 69.4 | 2.00 | CON | Yes | Yes |
| | | BOILER # 5 PSD Baseline | 5 | ATLSUG5B | 8,500 | -22,200 | 27.40 | 1.68 | 339.0 | 15.70 | -14.8 | -0.74 | EXP | No | Yes |

Table F-3. Summary of $NO_x$ Sources Included in the Air Modeling Analysis for Simultaneous Operation

| AIRS Number | Facility | Units | EU # | ISCST3 ID Name | Relative Location [e] X (m) | Relative Location [e] Y (m) | Stack Parameters Height (m) | Stack Parameters Diameter (m) | Stack Parameters Temper. (K) | Stack Parameters Velocity (m/s) | Emission Rate TPY | Emission Rate g/s | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0850001 | FP&L Martin | Units 1 & 2 | | MART12 | -1,300 | 25,500 | 152.10 | 7.99 | 420.9 | 21.03 | 22,732.0 | 653.94 | NO | Yes | No |
| | | Units 3 & 4 | | MART34 | -1,300 | 25,500 | 64.92 | 6.10 | 410.9 | 18.59 | 12,432.0 | 89.21 | CON | Yes | Yes |
| | | 2 Simple Cycle CTs | | MARTCTs | -1,300 | 25,500 | 18.30 | 6.71 | 853.2 | 37.63 | 325.4 | 93.39 | CON | Yes | Yes |
| | | Unit 8 | | MART8 | -1,300 | 25,500 | 36.60 | 5.79 | 397.6 | 13.59 | 664.0 | 19.12 | CON | Yes | Yes |
| 0990005 | OKEELANTA [a] | BOILER #4 PSD Baseline | 3 | OKBLR4B | -19,400 | -30,000 | 22.90 | 2.29 | 333.0 | 7.36 | -27.3 | -1.36 | EXP | No | Yes |
| | | BOILER #5 PSD Baseline | 4 | OKBLR5B | -19,400 | -30,000 | 22.90 | 2.29 | 333.0 | 12.07 | -37.8 | -1.89 | EXP | No | Yes |
| | | BOILER #6 PSD Baseline | 5 | OKBLR6B | -19,400 | -30,000 | 22.90 | 2.29 | 334.0 | 8.74 | -31.9 | -1.59 | EXP | No | Yes |
| | | BOILER # 10 PSD Baseline | 9 | OKBLR10B | -19,400 | -30,000 | 22.90 | 2.29 | 334.0 | 10.35 | -36.0 | -1.80 | EXP | No | Yes |
| | | BOILER # 11 PSD Baseline | 10 | OKBLR11B | -19,400 | -30,000 | 22.90 | 2.29 | 342.0 | 9.89 | -46.0 | -2.30 | EXP | No | Yes |
| | | BOILER # 12 PSD Baseline | 12 | OKBLR12B | -19,400 | -30,000 | 22.90 | 2.29 | 330.0 | 8.20 | -57.7 | -2.88 | EXP | No | Yes |
| | | BOILER # 14 PSD Baseline | 14 | OKBLR14B | -19,400 | -30,000 | 22.90 | 2.29 | 333.0 | 8.30 | -63.6 | -3.18 | EXP | No | Yes |
| | | BOILER # 15 PSD Baseline | 15 | OKBLR15B | -19,400 | -30,000 | 22.90 | 2.29 | 332.0 | 10.20 | -50.5 | -2.52 | EXP | No | Yes |
| | | BOILER # 16 | 16 | OKBLR16 | -19,400 | -30,000 | 22.86 | 1.52 | 483.2 | 22.86 | 113.8 | 3.28 | CON | Yes | Yes |
| 0990332 | New Hope Power Partnership | COGEN Units 1, 2, & 3 [b] | 123 | OKCOGEN | -20,310 | -27,390 | 60.66 | 3.05 | 438.7 | 17.5 | 862.5 | 24.8 | CON | Yes | Yes |
| 0510001 | EVERGLADES SUGAR | MAIN BOILER [b] | 2 | EVERGLAD | -34,800 | -13,200 | 21.95 | 1.07 | 477.6 | 10.06 | 168.0 | 4.82 | NO | Yes | No |
| 510003 | US Sugar - Clewiston | | | | | | | | | | | | | | |
| | | PSD Baseline (Crop season only) [a] | | | | | | | | | | | | | |
| | | Unit 1 PSD Baseline | | BRL1B | -38,300 | -10,500 | 23.1 | 1.86 | 344.0 | 30.20 | -93.7 | -6.27 | EXP | No | Yes |
| | | Unit 2 PSD Baseline | | BLR2B | -38,300 | -10,500 | 23.1 | 1.86 | 343.0 | 35.70 | -94.0 | -6.29 | EXP | No | Yes |
| | | Unit 3 PSD Baseline | | BLR3B | -38,300 | -10,500 | 27.4 | 2.29 | 342.0 | 14.70 | -45.1 | -3.03 | EXP | No | Yes |
| | | Units 4 PSD Baseline | | BLR4B | -38,300 | -10,500 | 45.7 | 2.51 | 344.3 | 25.40 | -127.9 | -8.76 | EXP | No | Yes |
| | | Units 5 PSD Baseline | | BLR5B | -38,300 | -10,500 | 23.1 | 1.86 | 494.0 | 44.30 | -20.9 | -1.54 | EXP | No | Yes |
| | | Units 6 PSD Baseline | | BLR6B | -38,300 | -10,500 | 23.1 | 1.86 | 494.0 | 44.30 | -18.0 | -1.34 | EXP | No | Yes |
| | | Off-crop season future [d] | | | | | | | | | | | | | |
| | | Unit 1 | | USSBRL1F | -38,300 | -10,500 | 65.0 | 2.44 | 347.0 | 14.05 | 142.4 | 4.10 | CON | Yes | Yes |
| | | Unit 2 | | USSBLR2F | -38,300 | -10,500 | 65.0 | 2.44 | 338.0 | 12.68 | 142.4 | 4.10 | CON | Yes | Yes |
| | | Unit 3 | | USSBLR3F | -38,300 | -10,500 | 65.0 | 2.44 | 333.2 | 6.20 | 136.1 | 3.92 | CON | Yes | Yes |
| | | Unit 4 | | USSBLR4F | -38,300 | -10,500 | 45.7 | 2.51 | 344.3 | 0.00 | 0.0 | 0.00 | CON | Yes | Yes |
| | | Unit 7 | | USSBLR7F | -38,300 | -10,500 | 68.6 | 2.59 | 405.4 | 23.60 | 332.1 | 9.56 | CON | Yes | Yes |
| | | On-crop season future [a] | | | | | | | | | | | | | |
| | | Unit 1 | | USSBRL1N | -38,300 | -10,500 | 65.0 | 2.44 | 347.0 | 14.05 | 313.7 | 9.03 | CON | Yes | Yes |
| | | Unit 2 | | USSBLR2N | -38,300 | -10,500 | 65.0 | 2.44 | 338.0 | 12.68 | 288.7 | 8.31 | CON | Yes | Yes |
| | | Unit 3 | | USSBLR3N | -38,300 | -10,500 | 65.0 | 2.44 | 333.2 | 6.20 | 195.0 | 5.62 | CON | Yes | Yes |
| | | Unit 4 | | USSBLR4N | -38,300 | -10,500 | 45.7 | 2.51 | 344.3 | 0.00 | 378.2 | 10.89 | CON | Yes | Yes |
| | | Unit 7 | | USSBLR7N | -38,300 | -10,500 | 68.6 | 2.59 | 405.4 | 23.60 | 476.0 | 13.71 | CON | Yes | Yes |
| 0990234 | Solid Waste Authority of PBC | | | | | | | | | | | | | | |
| | | 412.5MMBTU/HR RDF BOILER NO.1 (324,000 lb/hr STEAM) | 1 | SWAPB1 | 40,090 | -6,140 | 76.2 | 2.04 | 505.2 | 24.69 | 867.2 | 24.98 | NO | Yes | No |
| | | 412.5MMBTU/HR RDF BOILER NO.2 (324,000 lb./hr. steam) | 2 | SWAPB2 | 40,090 | -6,140 | 76.2 | 2.04 | 505.2 | 24.69 | 867.2 | 24.98 | NO | Yes | No |
| | | Landfill Gas Coll Sys class I | 3 | SWAPB3 | 40,090 | -6,140 | 7.0 | 0.21 | 1033.0 | 24.44 | 15.8 | 0.46 | NO | Yes | No |
| | | Landfill Gas Coll Sys class III | 4 | SWAPB4 | 40,090 | -6,140 | 7.0 | 0.15 | 1033.0 | 46.57 | 15.8 | 0.46 | NO | Yes | No |

Table F-3. Summary of $NO_x$ Sources Included in the Air Modeling Analysis for Simultaneous Operation

| AIRS Number | Facility | Units | EU # | ISCST3 ID Name | Relative Location[c] X (m) | Relative Location[c] Y (m) | Stack Parameters Height (m) | Stack Parameters Diameter (m) | Stack Parameters Temper. (K) | Stack Parameters Velocity (m/s) | Emission Rate TPY | Emission Rate g/s | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990042 | FP&L Riviera[c] | Units 3 & 4 | | RIVU34 | 49,800 | -6,800 | 90.83 | 4.88 | 401.5 | 26.88 | 16,565.2 | 476.53 | NO | Yes | No |
| 0990045 | Lake Worth Utilities[c] | Diesel Peking Units # 1-5 | | LAKWTH15 | 48,400 | -23,700 | 5.18 | 0.56 | 625.9 | 37.09 | 2,184.6 | 62.87 | NO | Yes | No |
| | | GAS TURBINE # 1 | 6 | LAKWTH6 | 48,400 | -23,700 | 14.02 | 4.88 | 720.4 | 24.84 | 1,715.0 | 49.39 | NO | Yes | No |
| | | STEAM GENERATING #1 | 7 | LAKWTH7 | 48,400 | -23,700 | 18.29 | 1.52 | 422.0 | 10.52 | 0.0 | 0.00 | NO | No | No |
| | | STEAM GENERATOR #3 | 9 | LAKWTH8 | 48,400 | -23,700 | 34.44 | 2.13 | 418.2 | 15.67 | 712.0 | 20.54 | NO | Yes | No |
| | | STEAM GENERATOR #4 | 10 | LAKWTH9 | 48,400 | -23,700 | 35.05 | 2.29 | 418.2 | 17.01 | 0.0 | 0.00 | NO | No | No |
| | | COMBINED CYCLE UNIT (GT-2/S-5) | 11 | LAKWTH10 | 48,400 | -23,700 | 22.86 | 3.05 | 479.8 | 26.67 | 1,252.0 | 36.04 | NO | Yes | No |
| 1110003 | Ft. Pierce Utilities Authority[c] | 2.75 MW West Diesel #1 | 1 | FTPRC1 | 21,720 | 68,950 | 7.01 | 0.91 | 9474.7 | 11.89 | 392.4 | 11.30 | NO | Yes | No |
| | | 2.75 MW East Diesel #2 | 2 | FTPRC2 | 21,720 | 68,950 | 7.01 | 0.91 | 9474.7 | 11.89 | 392.4 | 11.30 | NO | Yes | No |
| | | 23.4 MW Combined Cycle Gas Turbine with 8.2 MW HRSG-Unit # 9 | 3 | FTPRC3 | 21,720 | 68,950 | 20.73 | 3.41 | 196644.1 | 18.23 | 592.7 | 17.07 | NO | Yes | No |
| | | 16.5 MW Boiler Unit #6 | 4 | FTPRC4 | 21,720 | 68,950 | 45.11 | 1.52 | 23996.9 | 10.97 | 5.7 | 0.16 | NO | Yes | No |
| | | 33.0 MW Boiler Unit #7 (Phase II Acid Rain Unit) | 7 | FTPRC7 | 21,720 | 68,950 | 44.81 | 2.16 | 80855.8 | 18.62 | 457.1 | 13.16 | NO | Yes | No |
| | | 56.1 MW Boiler Unit #8 (Phase II Acid Rain Unit) | 8 | FTPRC8 | 21,720 | 68,950 | 45.72 | 2.44 | 140261.3 | 25.48 | 167.2 | 4.82 | NO | Yes | No |
| | | General Purpose Internal Combustion Engines | 10 | FTPRC10 | 21,720 | 68,950 | 45.72 | 2.44 | 140261.3 | 25.48 | 83.6 | 2.41 | NO | Yes | No |
| 0112120 | Wheelabrator North Broward[c] | UNIT #1;807 TPD MSW INCINERATOR | 1 | WHEELN1 | 39,500 | -59,800 | 59.44 | 2.29 | 421.9 | 63.76 | 686.8 | 209.33 | NO | Yes | No |
| | | UNIT #2 807 TPD MSW INCINERATOR | 2 | WHEELN2 | 39,500 | -59,800 | 59.44 | 2.29 | 421.9 | 63.76 | 686.8 | 209.33 | NO | Yes | No |
| | | UNIT #3 807 TPD MSW INCINERATOR | 3 | WHEELN3 | 39,500 | -59,800 | 59.44 | 2.29 | 421.9 | 63.76 | 686.8 | 209.33 | NO | Yes | No |
| 0610029 | City of Vero Beach[c] | Fossil Fuel Steam Generator Unit No.1 | 1 | VERO1 | 17,000 | 89,100 | 60.96 | 1.07 | 415.8 | 32.16 | 472.0 | 13.59 | NO | Yes | No |
| | | Fossil Fuel Steam Generator Unit No.2 | 2 | VERO2 | 17,000 | 89,100 | 60.96 | 1.07 | 448.0 | 41.82 | 580.0 | 16.70 | NO | Yes | No |
| | | Fossil Fuel Steam Generator Unit 3 (Phase II Acid Rain Unit) | 3 | VERO3 | 17,000 | 89,100 | 60.96 | 1.83 | 445.2 | 20.91 | 975.3 | 28.09 | NO | Yes | No |
| | | Fossil Fuel Steam Generator Unit 4 (Phase II Acid Rain Unit) | 4 | VERO4 | 17,000 | 89,100 | 60.96 | 2.13 | 412.4 | 23.68 | 1,800.2 | 51.85 | NO | Yes | No |
| | | Combined Cycle Gas Turbine Unit 5 (Phase II Acid Rain Unit) | 5 | VERO5 | 17,000 | 89,100 | 19.39 | 37.58 | 416.3 | 19.39 | 487.4 | 14.04 | CON | Yes | Yes |
| 0112119 | South Broward RRF[c] | UNIT #1, 863 TPD MSW INCINERATOR | 1 | SBROW1 | 35,200 | -84,100 | 59.44 | 2.29 | 380.8 | 17.68 | 793.7 | 22.86 | CON | Yes | Yes |
| | | UNIT #2, 863 TPD MSW INCINERATOR | 2 | SBROW2 | 35,200 | -84,100 | 59.44 | 2.29 | 380.8 | 17.68 | 793.7 | 22.86 | CON | Yes | Yes |
| | | UNIT #3, 863 TPD MSW INCINERATOR | 3 | SBROW3 | 35,200 | -84,100 | 59.44 | 2.29 | 380.8 | 17.68 | 793.7 | 22.86 | CON | Yes | Yes |
| 0110037 | Florida Power & Light--Lauderdale[c] | Bank of 12 Combustion Turbines (Nos. 1 to 12) | 3 | FPLCT3 | 35,700 | -84,100 | 13.72 | 2.37 | 733.0 | 114.30 | 5,161.4 | 148.65 | NO | Yes | No |
| | | Bank of 12 Combustion Turbines (No. 13 to 24) | 15 | FPLCT15 | 35,700 | -84,100 | 13.41 | 4.75 | 733.0 | 28.44 | 5,161.4 | 148.65 | NO | Yes | No |
| | | CCCT with HRSG (CT 4A) (Phase II Acid Rain Unit) | 35 | FPLCT35 | 35,700 | -84,100 | 45.72 | 5.49 | 255.2 | 48.37 | 3,065.0 | 88.27 | CON | Yes | Yes |
| | | CCCT with HRSG (CT 4B) (Phase II Acid Rain Unit) | 36 | FPLCT36 | 35,700 | -84,100 | 45.72 | 5.49 | 438.6 | 48.37 | 3,065.0 | 88.27 | CON | Yes | Yes |
| | | CCCT with HRSG (CT 5A) (Phase II Acid Rain Unit) | 37 | FPLCT37 | 35,700 | -84,100 | 45.72 | 5.49 | 438.6 | 48.37 | 1,639.0 | 47.20 | CON | Yes | Yes |
| | | CCCT with HRSG (CT 5B) (Phase II Acid Rain Unit) | 38 | FPLCT38 | 35,700 | -84,100 | 45.72 | 5.49 | 438.6 | 48.37 | 3,065.0 | 88.27 | CON | Yes | Yes |
| | | Units 4 & 5 Baseline | | FPL45B | 35,700 | -84,100 | 46.00 | 4.27 | 422.0 | 14.63 | 0.0 | 0.00 | EXP | No | No |
| 0110036 | FP&L--Port Everglades[c] | 232 NW FFSG #1 w/Low Excess Air Burners&Multi-Cyclones | 1 | FPPE1 | 43,000 | -82,100 | 104.85 | 4.27 | 408.0 | 18.29 | 5,729.0 | 165.00 | NO | Yes | No |
| | | 232 NW FFSG #2 w/Low Excess Air Burners&Multi-Cyclones | 2 | FPPE2 | 43,000 | -82,100 | 104.85 | 4.27 | 416.3 | 4.88 | 5,729.0 | 165.00 | NO | Yes | No |
| | | 401 NW FFSG #3 w/Low Excess Air Burners&Multi-Cyclones | 3 | FPPE3 | 43,000 | -82,100 | 104.85 | 5.52 | 408.0 | 19.20 | 16,609.0 | 478.34 | NO | Yes | No |
| | | 401 NW FFSG #4 w/Low Excess Air Burners&Multi-Cyclones | 4 | FPPE4 | 43,000 | -82,100 | 104.85 | 5.52 | 408.0 | 19.20 | 16,609.0 | 478.34 | NO | Yes | No |
| | | Gas Turbines Electric Generating Unit #1-12 | 5 | FPPE5 | 43,000 | -82,100 | 13.41 | 4.75 | 683.0 | 10.67 | 6,633.0 | 191.03 | NO | Yes | No |
| 0550018 | Tampa Electric Co.--PHILLIPS[c] | SLOW SPEED DIESEL ELECTRIC GENERATOR UNIT 1 P | 1 | TECO1 | -80,100 | 68,000 | 45.72 | 1.83 | 441.3 | 24.08 | 2,504.5 | 72.13 | NO | Yes | No |
| | | SLOW SPEED DIESEL ELECTRIC GENERATOR UNIT 2 P | 2 | TECO2 | -80,100 | 68,000 | 45.72 | 1.83 | 449.7 | 24.08 | 2,504.5 | 72.13 | NO | Yes | No |
| | | BOILER CLEAVER BROOKS CB200X-250 HEAT INPUT 10.46 MMBTU/HR | 4 | TECO4 | -80,100 | 68,000 | 18.90 | 0.67 | ND | ND | 6.5 | 0.19 | NO | No | No |

Table F-3. Summary of $NO_x$ Sources Included in the Air Modeling Analysis for Simultaneous Operation

| AIRS Number | Facility | Units | EU # | ISCST3 ID Name | Relative Location [e] X (m) | Relative Location [e] Y (m) | Stack Parameters Height (m) | Stack Parameters Diameter (m) | Stack Parameters Temper. (K) | Stack Parameters Velocity (m/s) | Emission Rate TPY | Emission Rate g/s | PSD Source? (EXP/CON) | Modeled in AAQS | Modeled in Class II |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0250020 | Tarmac-Pennsuco Cement [c] | KILN #2 (Restart 1990) | 4 | TARM4 | 18,500 | -105,700 | 60.96 | 2.29 | 421.9 | 10.06 | 867.2 | 24.98 | CON | Yes | Yes |
| | | KILN #3 | 6 | TARM6 | 18,500 | -105,700 | 60.96 | 4.27 | 481.9 | 10.97 | 2,594.0 | 74.71 | CON | Yes | Yes |
| | | 125 ton per hour slag dryer | 20 | TARM20 | 18,500 | -105,700 | 9.14 | 1.22 | 421.9 | 17.98 | 12.8 | 0.37 | CON | Yes | Yes |
| | | KILN #3 Baseline | | TARM3B | 18,500 | -105,700 | 60.96 | 4.57 | 450.0 | 11.04 | -2,112.3 | -60.83 | EXP | No | Yes |
| 0250348 | Miami-Dade RRF/Montenay [c] | Boilers #1-4 | 14 | MDADE14 | 19,430 | -109,780 | 76.20 | 2.57 | 422.0 | 20.61 | 2,459.6 | 70.84 | CON | Yes | Yes |
| | | Boilers #1-4 Baseline | 14 | MDADE14B | 19,430 | -109,780 | 45.70 | 2.74 | 461.0 | 30.34 | 749.0 | 21.57 | CON | Yes | Yes |
| 0710002 | FP&L Fort Myers [c] | Gas Turbines 1 - 12 | | FMYGT112 | -122,300 | -14,500 | 9.75 | 4.42 | 797.0 | 57.73 | 31,272.0 | 900.00 | NO | Yes | No |
| | | HRSGs 1 - 6 | | FMYHR16 | -122,300 | -14,500 | 38.10 | 5.79 | 377.6 | 21.43 | 1,708.2 | 49.14 | CON | Yes | Yes |
| | | CT1 - 2 | | FMCT1_2 | -122,300 | -14,500 | 24.40 | 6.25 | 852.0 | 39.08 | 293.1 | 84.12 | CON | Yes | Yes |
| | | Unit No. 1 PSD Baseline | | FMU1B | -122,300 | -14,500 | 91.74 | 2.90 | 435.9 | 28.04 | -910.0 | -26.21 | EXP | No | Yes |
| | | Unit No. 2 PSD Baseline | | FMU2B | -122,300 | -14,500 | 121.31 | 5.52 | 414.3 | 21.03 | -4,140.0 | -119.23 | EXP | No | Yes |

[a] Facilities or sources that operate only during the October 1 through April 31 crop season.

[b] Sugar mill sources that operate all year.

[c] Large source (>1,000 TPY) outside the screening area that are included in the modeling analysis.

[d] Sugar mill sources that operate only during the May 1 through September 30 off-crop season (assumes 150 days).

[e] Location relative to the midpoint of the cogen Boilers Nos. 1 and 2 stack locations.

Note: EXP = PSD expanding source.
CON = PSD consuming source.
NO = Source does not affect PSD increment.
ND = No data available.

Table F-4. Summary of CO Sources Included in the AAQS Air Modeling Analysis for Simultaneous Operation

| AIRS Number | Facility | Units | ISCST3 ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Diameter (m) | Temperature (K) | Velocity (m/s) | Emission Rate lb/hr | Emission Rate g/s |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990061 | U.S. Sugar -Bryant [a] | Unit 5 PSD | USSBRY5 | -6600 | 1700 | 42.7 | 2.90 | 345.0 | 11.49 | 6,039.0 | 760.91 |
| | | Unit 1,2&3 | USBRY123 | -6600 | 1700 | 19.8 | 1.64 | 342.0 | 36.40 | 10,395.0 | 1,309.77 |
| 0990026 | Sugar Cane Growers [a] | Unit 1&2 | SUGCN12 | -9500 | -14100 | 45.7 | 1.87 | 339.0 | 21.75 | 4,342.0 | 547.09 |
| | | Unit 3 | SUGCN3 | -9500 | -14100 | 27.4 | 1.52 | 339.0 | 22.25 | 1,489.0 | 187.61 |
| | | Unit 4 PSD | SUGCN4 | -9500 | -14100 | 54.9 | 2.44 | 339.0 | 21.73 | 3,712.0 | 467.71 |
| | | Unit 5 | SUGCN5 | -9500 | -14100 | 45.7 | 2.30 | 339.0 | 15.94 | 2,854.0 | 359.60 |
| | | Unit 8 PSD | SUGCN8 | -9500 | -14100 | 47.2 | 2.90 | 339.0 | 13.62 | 3,024.0 | 381.02 |
| 0990021 | Pratt & Whitney (United Technologies) | Jet Engine | PWJETEG | -10900 | -13300 | 21.3 | 18.30 | 383.2 | 12.20 | 166,667 | 21,000 |
| | | Unit 1 | PRWIT1 | -10900 | -13300 | 15.2 | 0.91 | 810.9 | 143.70 | 12.9 | 1.63 |
| | | Unit 16 | PRWIT16 | -10900 | -13300 | 4.6 | 0.76 | 533.2 | 6.90 | 3.4 | 0.43 |
| | | Unit 22 | PRWIT22 | -10900 | -13300 | 20.1 | 2.32 | 672.0 | 10.20 | 8.8 | 1.11 |
| | | Unit 40 | PRWIT40 | -10900 | -13300 | 14.9 | 1.22 | 298.2 | 0.04 | 1.0 | 0.12 |
| | | Unit 45 | PRWIT45 | -10900 | -13300 | 3.7 | 0.15 | 298.2 | 2.60 | 16.0 | 2.01 |
| | | Unit 59 | PRWIT59 | -10900 | -13300 | 6.1 | 0.46 | 533.2 | 4.90 | 5.1 | 0.64 |
| | | Unit 68 | PRWIT68 | -10900 | -13300 | 3.7 | 0.24 | 922.0 | 151.40 | 1.8 | 0.23 |
| | | Unit 69 | PRWIT69 | -10900 | -13300 | 5.5 | 3.66 | 422.0 | 0.08 | 47.5 | 5.98 |
| | | A-10 Test Stand | PRWA10 | -10900 | -13300 | 5.8 | 4.17 | 410.9 | 106.68 | 109.4 | 13.78 |
| 0850102 | Bechtel Indiantown | | BECHTIND | 17600 | 8600 | 150.9 | 4.88 | 333.2 | 30.50 | 376.0 | 47.38 |
| 0990016 | Atlantic Sugar Association[a] | Unit 1 | ATLSUG1 | 1200 | 24100 | 27.4 | 1.83 | 346.0 | 17.97 | 2,380.2 | 299.90 |
| | | Unit 2 | ATLSUG2 | 1200 | 24100 | 27.4 | 1.83 | 350.0 | 23.36 | 4,647.6 | 585.60 |
| | | Unit 3 | ATLSUG3 | 1200 | 24100 | 27.4 | 1.83 | 350.0 | 21.56 | 1,430.2 | 180.20 |
| | | Unit 4 | ATLSUG4 | 1200 | 24100 | 27.4 | 1.83 | 344.0 | 25.16 | 1,430.2 | 180.20 |
| | | Unit 5 [b] | ATLSUG5 | 1200 | 24100 | 27.4 | 1.68 | 339.0 | 19.24 | 1,659.5 | 209.10 |
| 0850001 | FPL -Martin | Units 1&2 | MART12 | -21000 | -12200 | 152.1 | 7.99 | 420.9 | 21.03 | 308.9 | 38.92 |
| | | Aux Blr PSD | MARTAUX | -21000 | -12200 | 18.3 | 1.10 | 535.4 | 15.24 | 3.6 | 0.454 |
| | | Diesel Gens PSD | MARTGEN | -21000 | -12200 | 7.6 | 0.30 | 785.9 | 39.62 | 6.7 | 0.845 |
| | | Units 3&4 PSD | MART34 | -21000 | -12200 | 64.9 | 6.10 | 410.9 | 18.90 | 211.6 | 26.66 |
| | | Unit 8 | MART8 | -21000 | -12200 | 36.6 | 5.79 | 397.6 | 13.59 | 44.3 | 5.582 |
| 0990332 | New Hope Power Partnership (Okeelanta) | Cogen Blrs 1,2,& 3 | OKCOGEN | -1300 | 25500 | 68.6 | 3.05 | 438.7 | 17.46 | 750.9 | 94.61 |
| 0510003 | U.S. Sugar Clewiston | | | | | | | | | | |
| | | Unit 1 | BRL1 | -34800 | -13200 | 65.0 | 2.44 | 347.0 | 19.20 | 6,442.8 | 811.79 |
| | | Unit 2 | BLR2 | -34800 | -13200 | 65.0 | 2.44 | 338.0 | 17.32 | 5,811.0 | 732.19 |
| | | Unit 3 | BLR3 | -34800 | -13200 | 65.0 | 2.44 | 333.2 | 8.47 | 2,653.0 | 334.28 |
| | | Unit 4 | BLR4 | -34800 | -13200 | 45.7 | 2.51 | 344.3 | 25.35 | 4,114.5 | 518.43 |
| | | Unit 7 | BLR7 | -34800 | -13200 | 68.6 | 2.59 | 405.4 | 25.96 | 568.4 | 71.62 |

Table F-4. Summary of CO Sources Included in the AAQS Air Modeling Analysis for Simultaneous Operation

| AIRS Number | Facility | Units | ISCST3 ID Name | Relative Location X (m) | Relative Location Y (m) | Stack and Operating Parameters Height (m) | Diameter (m) | Temperature (K) | Velocity (m/s) | Emission Rate lb/hr | Emission Rate g/s |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0990234 | Palm Beach Resource Recovery | | | | | | | | | | |
| | | 412.5 MMBtu/hr RDF Boiler No. 1 | PBRRB1 | 11800 | -39600 | 76.2 | 2.0 | 505.2 | 24.69 | 178.3 | 22.46 |
| | | 412.5 MMBtu/hr RDF Boiler No. 2 | PBRRB2 | 11800 | -39600 | 76.2 | 2.0 | 505.2 | 24.69 | 178.3 | 22.46 |
| | | Landfill Gas Coll Sys class I | PBRRLG1 | 11800 | -39600 | 7.0 | 0.2 | 1033.0 | 24.44 | 19.6 | 2.47 |
| | | Landfill Gas Coll Sys class III | PBRRLG3 | 11800 | -39600 | 7.0 | 0.2 | 1033.0 | 46.57 | 19.6 | 2.47 |
| 0990042 | FPL - Riveria Beach | | | | | | | | | | |
| | | Fossil Fuel Steam Generator, Unit 3 | FPLRIV3 | 30800 | 39400 | 90.8 | 4.9 | 401.3 | 88.20 | 132.0 | 16.63 |
| | | Fossil Fuel Steam Generator, Unit 4 | FPLRIV4 | 30800 | 39400 | 90.8 | 4.9 | 401.3 | 87.30 | 132.0 | 16.63 |
| | | Emerg.diesel gen.and mobile equip. & eng | FPLRIVEG | 30800 | 39400 | | | | | | |
| 0510015 | Southern Gardens Citrus - PSD | Peel Dryer | SGARDDRY | 48400 | -23700 | 38.1 | 1.16 | 353.0 | 7.45 | 926.0 | 116.68 |
| | | Boilers 1-3 | SGARDBLR | 48400 | -23700 | 16.8 | 1.22 | 478.0 | 14.23 | 4.0 | 0.50 |
| 0110037 | FPL - Lauderdale | | | | | | | | | | |
| | | Bank of 12 CTs (Nos. 1 to 12) | LAUDCT12 | 39200 | -59800 | 13.7 | 2.37 | 733.0 | 114.30 | 966.0 | 121.72 |
| | | Bank of 12 CTs (No. 13 to 24) | LDCT1324 | 39200 | -59800 | 13.4 | 4.75 | 733.0 | 28.44 | 966.0 | 121.72 |
| | | CCCT with HRSG (CT 4A) | LDCT4A | 39200 | -59800 | 45.7 | 5.49 | 255.2 | 48.37 | 89.0 | 11.21 |
| | | CCCT with HRSG (CT 4B) | LDCT4B | 39200 | -59800 | 45.7 | 5.49 | 438.6 | 48.37 | 89.0 | 11.21 |
| | | CCCT with HRSG (CT 5A) | LDCT5A | 39200 | -59800 | 45.7 | 5.49 | 438.6 | 48.37 | 89.0 | 11.21 |
| | | CCCT with HRSG (CT 5B) | LDCT5B | 39200 | -59800 | 45.7 | 5.49 | 438.6 | 48.37 | 89.0 | 11.21 |
| 0110036 | FPL -Port Everglades | | | | | | | | | | |
| | | Steam Generator-Unit 1 | EVERG1 | 39300 | -62000 | 104.9 | 4.27 | 408.0 | 18.29 | 201.6 | 25.40 |
| | | Steam Generator-Unit 2 | EVERG2 | 39300 | -62000 | 104.9 | 4.27 | 416.3 | 4.88 | 201.6 | 25.40 |
| | | Steam Generator-Unit 3 | EVERG3 | 39300 | -62000 | 104.9 | 5.52 | 408.0 | 19.20 | 351.1 | 44.24 |
| | | Steam Generator-Unit 4 | EVERG4 | 39300 | -62000 | 104.9 | 5.52 | 408.0 | 19.20 | 351.1 | 44.24 |
| | | 12 CTs-GT1 through GT12 | EVERCTs | 39300 | -62000 | 13.4 | 4.75 | 683.0 | 10.67 | 707.6 | 89.16 |
| 0250020 | Tarmac - Pennsuco Cement | | | | | | | | | | |
| | | Kiln #2 | TARMK2 | 22700 | 89100 | 61.0 | 2.3 | 421.9 | 10.06 | 346.0 | 43.60 |
| | | Kiln #3 | TARMK3 | 22700 | 89100 | 61.0 | 4.3 | 482.0 | 10.97 | 338.0 | 42.59 |
| | | 125 ton per hour slag dryer | TARMSD | 22700 | 89100 | 9.1 | 1.2 | 421.9 | 17.98 | 2.1 | 0.26 |
| 0250348 | Dade Co. Resource Recovery | | | | | | | | | | |
| | | Boilers # 1-4 | DCRR1 | 35200 | -84100 | 76.2 | 2.6 | 422.0 | 20.61 | 307.8 | 38.78 |
| 0710002 | FPL Fort Myers | Gas Turbines 1 - 12 | FMGT112 | 43000 | -82100 | 9.8 | 3.47 | 797.0 | 57.73 | 489.6 | 61.69 |
| | | HRSGs 1-6 | FMCT1_6 | 43000 | -82100 | 38.1 | 5.79 | 377.6 | 21.43 | 258.0 | 32.51 |
| | | CT 1 - 2 | FMCT1_2 | 43000 | -82100 | 24.4 | 6.25 | 852.00 | 39.1 | 272.4 | 34.32 |

[a] Facilities or sources with facilities that operate only during the October 1 through April 30 crop season.

[b] Sugar mill sources that operate all year.

# APPENDIX G

# CALPUFF MODEL DESCRIPTION AND METHODOLOGY

# CALPUFF MODEL DESCRIPTION AND METHODOLOGY

## G.1 INTRODUCTION

As part of the new source review requirements under Prevention of Significant Deterioration (PSD) regulations, new sources are required to address air quality impacts at PSD Class I areas. As part of the PSD analysis report submitted to the Florida Department of Environmental Protection (DEP), the air quality impacts due to the potential emissions of the proposed Palm Beach Power project are required to be addressed at the PSD Class I area of the Everglades National Park (ENP). The ENP is located approximately 119 km south of the facility site and is the only PSD Class I area within 200 km of the facility.

The evaluation of air quality impacts are not only concerned with determining compliance with PSD Class I increments but also assessing a source's impact on Air Quality Related Values (AQRVs), such as regional haze. Further, compliance with PSD Class I increments can be evaluated by determining if the source's impacts are less than the proposed U.S. Environmental Protection Agency (EPA) Class I significant impact levels. The significant impact levels are threshold levels that are used to determine the type of air impact analyses needed for the facility. If the new source's impacts are predicted to be less than significant, then the source's impacts are assumed not to have a significant adverse affect on air quality and additional modeling with other sources is not required. However, if the source's impacts are predicted to be greater than the significant impact levels, additional modeling with other sources is required to demonstrate compliance with Class I increments.

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 Federal Land Managers (FLM) of Class I areas who are responsible for ensuring that AQRVs are not adversely impacted by new and existing sources. These recommendations have been summarized 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.
- *Federal Land Managers' Air Quality Related Values Workgroup (FLAG), Phase I Report,* USFS, NPS, USFWS (12/00), referred to as the FLAG document.

For the proposed project, air quality analyses were performed that assess the facility's impacts in the PSD Class I area of the ENP using the refined modeling approach from the IWAQM Phase 2 report for:

- Significant impact analysis;
- $SO_2$ PSD Class I increment analysis;
- Regional haze analysis; and
- Sulfur and Nitrogen deposition analysis.

The refined analysis approach was used instead of the screening analysis approach since the air quality impacts are based on generally more realistic assumptions, include more detailed meteorological data, and are estimated at locations at the Class I area.

## G.2 GENERAL AIR MODELING APPROACH

The general modeling approach was based on using the long-range transport model, California Puff model (CALPUFF, Version 5.4). At distances beyond 50 km, the ISCST3 model is considered to over-predict air quality impacts, because it is a steady-state model. At those distances, the CALPUFF model is recommended for use. Recently, the FLM have requested that air quality impacts, such as for regional haze, for a source located more than 50 km from a Class I area be predicted using the CALPUFF model. The Florida DEP has also recommended that the CALPUFF model be used to assess if the source has a significant impact at a Class I area located beyond 50 km from the source. As a result, a significant impact and regional haze analyses were performed using the CALPUFF model to assess the facility's impacts at the ENP.

The methods and assumptions used in the CALPUFF model were based on the latest recommendations for a refined analysis as presented in the IWAQM Phase 2 Summary Report and the FLAG documents.

A regional haze analysis was performed to determine the affect that the facility's emissions will have on background regional haze levels at the ENP. In the regional haze analysis, the change in visual range, as calculated by a deciview change, was estimated for the facility in accordance with the IWAQM recommendations. Based on those recommendations, the CALPUFF model is used to predict the maximum 24-hour average sulfate ($SO_4$), nitrate ($NO_3$), and fine particulate ($PM_{10}$) concentrations as well as ammonium sulfate [$(NH_4)_2SO_4$] and ammonium nitrate ($NH_4NO_3$) concentrations. The change in visibility due to a source, estimated as a percentage, is then calculated based on the change from background data.

The following sections present the methods and assumptions used to assess the refined significant impact and regional haze analyses performed for the Proposed Project. The results of these analyses are presented in Sections 7.0 and 8.0 of the PSD report.

## G.3 MODEL SELECTION AND SETTINGS

The California Puff (CALPUFF, version 5.4) air modeling system was used to model to assess the Proposed Project's impacts at the PSD Class I area for comparison to the PSD Class I significant impact levels and to the regional haze visibility criteria. CALPUFF is a non-steady state Lagrangian Gaussian puff long-range transport model that includes algorithms for building downwash effects as well as chemical transformations (important for visibility controlling pollutants), and wet/dry deposition. The CALPUFF meteorological and geophysical data preprocessor (CALMET, Version 5.2), a preprocessor to CALPUFF, is a diagnostic meteorological model that produces a three-dimensional field of wind and temperature and a two-dimensional field of other meteorological parameters. CALMET was designed to process raw meteorological, terrain and land-use databases to be used in the air modeling analysis. The CALPUFF modeling system uses a number of FORTRAN preprocessor programs that extract data from large databases and converts the data into formats suitable for input to CALMET. The processed data produced from CALMET was input to CALPUFF to assess the pollutant specific impact. Both CALMET and CALPUFF were used in a manner that is recommended by the IWAQM Phase 2 and FLAG reports.

### G.3.1 CALPUFF MODEL APPROACHES AND SETTINGS

The IWAQM has recommended approaches for performing a Phase 2 refined modeling analyses that are presented in Table G-1. These approaches involve use of meteorological data, selection of receptors and dispersion conditions, and processing of model output.

The specific settings used in the CALPUFF model are presented in Table G-2.

### G.3.2 EMISSION INVENTORY AND BUILDING WAKE EFFECTS

The CALPUFF model included the facility's emission, stack, and operating data as well as building dimensions to account for the effects of building-induced downwash on the emission sources. Dimensions for all significant building structures were processed with the Building Profile Input Program (BPIP), Version 95086, and were included in the CALPUFF model input. The PSD Analysis Report presents a listing of the facility's emissions and structures included in the analysis.

## G.4 RECEPTOR LOCATIONS

For the refined analyses, pollutant concentrations were predicted in an array of 126 discrete receptors located at the ENP area. These receptors are the same as those used in the PSD Class I analysis performed for the PSD Analysis Report.

## G.5 METEOROLOGICAL DATA

### G.5.1 REFINED ANALYSIS

CALMET was used to develop the gridded parameter fields required for the refined modeling analyses. The follow sections discuss the specific data used and processed in the CALMET model.

### G.5.2 CALMET SETTINGS

The CALMET settings contained in Table G-3 were used for the refined modeling analysis. With the exception of hourly precipitation data files, all input data files needed for CALMET were developed by the FDEP staff.

### G.5.3 MODELING DOMAIN

A rectangular modeling domain extending 450 km in the east-west (x) direction and 470 km in the north-south (y) direction was used for the refined modeling analysis. The southwest corner of the domain is the origin and is located at 23.8 degrees north latitude and 83.5 degrees west longitude. This location is in the Gulf of Mexico approximately 110 km west of Venice, Florida. For the processing of meteorological and geophysical data, the domain contains 90 grid cells in the x-direction and 94 grid cells in the y-direction. The domain grid resolution is 5 km. The air modeling analysis was performed in the UTM coordinate system.

### G.5.4 MESOSCALE MODEL – GENERATION 4 (MM4) DATA

Pennsylvania State University in conjunction with the NCAR Assessment Laboratory developed the MM4 data set, a prognostic wind field or "guess" field, for the United States. The hourly meteorological variables used to create this data set (wind, temperature, dew point depression, and geopotential height for eight standard levels and up to 15 significant levels) are extensive and only allow for one database set for the year 1990. The analysis used the MM4 data to initialize the CALMET wind field. The MM4 data have a horizontal spacing of 80 km and are used to simulate atmospheric variables within the modeling domain.

The MM4 subset domain was provided by FDEP and consisted of a 7 x 7- cell rectangle, with 80 km grid resolution, extending from the MM4 grid points (50,6) to (57,13). These data were processed to create a MM4.DAT file, for input to the CALMET model.

The MM4 data set used in the CALMET, although advanced, lacks the fine detail of specific temporal and spatial meteorological variables and geophysical data. These variables were processed into the appropriate format and introduced into the CALMET model through the additional data files obtained from the following sources.

### G.5.5 SURFACE DATA STATIONS AND PROCESSING

The surface station data processed for the CALPUFF analyses consisted of data from eight NWS stations or Federal Aviation Administration (FAA) Flight Service stations for Orlando, Fort Myers, Daytona Beach, Vero Beach, Key West, Miami, Tampa, and West Palm Beach. A summary of the surface station information and locations are presented in Table G-4. The surface station parameters include wind speed, wind direction, cloud ceiling height, opaque cloud cover, dry bulb temperature, relative humidity, station pressure, and a precipitation code that is based on current weather conditions. The surface station data were processed by FDEP into a SURF.DAT file format for CALMET input.

Because the modeling domain extends largely over water, C-Man station data from Venice, Sombrero Key, and Lake Worth was obtained. These data were processed by Florida DEP into an over-water surface station format (i.e., SEA*.DAT) for input to CALMET. The over-water station data include wind direction, wind speed and air temperature.

### G.5.6 UPPER AIR DATA STATIONS AND PROCESSING

The analysis included three upper air NWS stations located in Ruskin, Key West, and West Palm Beach. Data for each station were obtained from the Florida DEP in a format for CALMET input. The data and locations for the upper air stations are presented in Table G-4.

### G.5.7 PRECIPITATION DATA STATIONS AND PROCESSING

Precipitation data were processed from a network of hourly precipitation data files collected from primary and secondary NWS precipitation-recording stations located within the latitude and longitudinal limits of the modeling domain. Data for 23 stations were obtained in NCDC TD-3240 variable format and converted into a fixed-length format. The utility programs PXTRACT and PMERGE were then used to

process the data into the format for the PRECIP.DAT file that is used by CALMET. A listing of the precipitation stations used for the modeling analysis is presented in Table G-5.

### G.5.8 GEOPHYSICAL DATA PROCESSING

Terrain elevations for each grid cell of the modeling domain were obtained from 1-degree Digital Elevation Model (DEM) files obtained from the U.S. Geographical Survey (USGS) internet website. The DEM data was extracted for the modeling domain grid using the utility program TERREL. Land-use data were also extracted from 1-degree USGS files and processed using utility programs CTGCOMP and CTGPROC. Both the terrain and land use files were combined into a GEO.DAT file for input to CALMET with the MAKEGEO utility program.

Table G-1. Refined Modeling Analyses Recommendations [a]

| Model Input/Output | Description |
|---|---|
| Meteorology | Use CALMET (minimum 6 to 10 layers in the vertical; top layer must extend above the maximum mixing depth expected); horizontal domain extends 50 to 80 km beyond outer receptors and sources being modeled; terrain elevation and land-use data is resolved for the situation. |
| Receptors | Within Class I area(s) of concern; obtain regulatory concurrence on coverage. |
| Dispersion | 1. CALPUFF with default dispersion settings.<br>2. Use MESOPUFF II chemistry with wet and dry deposition.<br>3. Define background values for ozone and ammonia for area. |
| Processing | 1. For PSD increments: use highest, second highest 3-hour and 24-hour average $SO_2$ concentrations; highest, second highest 24-hour average $PM_{10}$ concentrations; and highest annual average $SO_2$, $PM_{10}$ and $NO_x$ concentrations.<br>2. For haze: process, on a 24-hour basis, compute the source extinction from the maximum increase in emissions of $SO_2$, $NO_x$ and $PM_{10}$; compute the daily relative humidity factor [f(RH)], provided from an external disk file; and compute the maximum percent change in extinction using the FLM supplied background extinction data in the FLAG document.<br>3. For significant impact analysis: use highest annual and highest short-term averaging time concentrations for $SO_2$, $PM_{10}$ and $NO_x$, |

[a] IWAQM Phase II report (December, 1998) and FLAG document (December, 2000)

Table G-2. CALPUFF Model Settings

| Parameter | Setting |
|---|---|
| Pollutant Species | $SO_2$, $SO_4$, $NO_x$, $HNO_3$, $NO_3$, $PM_{10}$, Pb, F |
| Chemical Transformation | MESOPUFF II scheme, hourly ozone data |
| Deposition | Include both dry and wet deposition, plume depletion |
| Meteorological/Land Use Input | CALMET |
| Plume Rise | Transitional, Stack-tip downwash, Partial plume penetration |
| Dispersion | Puff plume element, PG/MP coefficients, rural mode, ISC building downwash scheme |
| Terrain Effects | Partial plume path adjustment |
| Output | Create binary concentration file including output species for $SO_4$, $NO_3$, $PM_{10}$, $SO_2$, and $NO_x$; process for visibility change using Method 2 and FLAG background extinctions |
| Model Processing | For haze: highest predicted 24-hour extinction change (%) for the year<br>For deposition: annual average deposition rate<br>For significant impact analysis: highest predicted annual and highest short-term averaging time concentrations for $SO_2$, $NO_x$, and $PM_{10}$. |
| Background Values | Ozone: 80 ppb; Ammonia: 0.5 ppb |

[a] Recommended values by the Florida DEP.

Table G-3. CALMET Settings

| Parameter | Setting |
|---|---|
| Horizontal Grid Dimensions | 450 by 470 km, 5 km grid resolution |
| Vertical Grid | 9 layers |
| Weather Station Data Inputs | 8 surface, 3 upper air, 23 precipitation stations |
| Wind model options | Diagnostic wind model, no kinematic effects |
| Prognostic wind field model | MM4 data, 80 km resolution, 7 x 7 grid, used for wind field initialization |
| Output | Binary hourly gridded meteorological data file for CALPUFF input |

Table G-4. Surface and Upper Air Stations Used in the CALPUFF Analysis

| Station Name | Station Symbol | WBAN Number | UTM Coordinates Easting (km) | Northing (km) | Zone | Anemometer Height (m) |
|---|---|---|---|---|---|---|
| Surface Stations | | | | | | |
| Tampa | TPA | 12842 | 349.20 | 3094.25 | 17 | 6.7 |
| Daytona Beach | DAB | 12834 | 495.14 | 3228.05 | 17 | 9.1 |
| Orlando | ORL | 12815 | 468.96 | 3146.88 | 17 | 10.1 |
| Vero Beach | VER | 12843 | 557.52 | 3058.36 | 17 | 6.7 |
| Fort Myers | FMY | 12835 | 413.65 | 2940.38 | 17 | 6.1 |
| Miami | MIA | 12839 | 566.82 | 2857.20 | 17 | 7.0 |
| Key West | EYW | 12836 | 424.03 | 2715.14 | 17 | 18.3 |
| West Palm Beach | PBI | 12844 | 587.87 | 2951.43 | 17 | 10.1 |
| Upper Air Stations | | | | | | |
| Ruskin | TBW | 12842 | 349.20 | 3094.28 | 17 | NA |
| West Palm Beach | PBI | 12844 | 587.87 | 2951.42 | 17 | NA |
| Key West | EYW | 12836 | 424.03 | 2715.14 | 17 | NA |

Table G-5. Hourly Precipitation Stations Used in the CALPUFF Analysis

| Station Name | Station Number | UTM Coordinate Easting (km) | Northing (km) | Zone |
|---|---|---|---|---|
| Belle Glade HRCN GT 4 | 80616 | 528.19 | 2953.03 | 17 |
| Boca Raton | 80845 | 588.75 | 2916.52 | 17 |
| Canal Point Gate 5 | 81271 | 536.43 | 2971.51 | 17 |
| Clewiston US Engineers | 81654 | 546.19 | 2912.73 | 17 |
| Fort Myers FAA/AP | 83186 | 413.99 | 2940.71 | 17 |
| Homestead Exp Stn | 84091 | 550.26 | 2820.21 | 17 |
| Key West Intl AP | 84570 | 423.67 | 2715.51 | 17 |
| Miami WSCMO Airport | 85663 | 570.20 | 2856.17 | 17 |
| Moore Haven Lock 1 | 85895 | 491.61 | 2967.80 | 17 |
| North New River Canal # | 86323 | 546.58 | 2912.48 | 17 |
| Ortona Lock 2 | 86657 | 470.17 | 2962.27 | 17 |
| Parrish | 86880 | 366.99 | 3054.39 | 17 |
| Pennsuco 5 WNW | 86988 | 554.70 | 2867.81 | 17 |
| Port Mayaca S l Canal | 87293 | 538.04 | 2984.44 | 17 |
| St Lucie New Lock 1 | 87859 | 571.04 | 2999.35 | 17 |
| St Petersburg | 87886 | 339.61 | 3071.99 | 17 |
| Tamiami Trail 40 Mi BEN | 88780 | 517.64 | 2849.04 | 17 |
| Tampa WSCMO AP | 88788 | 348.48 | 3093.67 | 17 |
| Trail Glade Ranges | 89010 | 551.57 | 2849.99 | 17 |
| Venice | 89176 | 357.59 | 2998.18 | 17 |
| Venus | 89184 | 467.27 | 3001.22 | 17 |
| Vero Beach 4 W | 89219 | 554.27 | 3056.50 | 17 |
| West Palm Beach Int AP | 89525 | 589.61 | 2951.63 | 17 |

# APPENDIX H

# BPIP INPUT/OUTPUT AND SAMPLE ISCST3 AND CALPUFF INPUT FILES

```
'BPIP data for Osceola Power 3/20/02'
'ST'
'METERS' 1.0
'UTMN' 0.00

'COGEN BLRS (C-E)' 1 0.0
4 36.58
  -27.0    -50.0
   15.0    -50.0
   15.0    -73.0
  -27.0    -73.0
'EXISTING MAIN BLDG' 1 0.0
12 21.34
  183.0      1.0
  213.0      1.0
  213.0    -32.0
  223.0    -32.0
  223.0    -47.0
  213.0    -47.0
  213.0    -73.0
  229.0    -73.0
  229.0    -91.0
  159.0    -91.0
  159.0    -73.0
  183.0    -73.0
9
'COGEN'   0.0   60.7    0      0
'OSBLR5A'  0.0   27.4  150     -6
'OSBLR5B'  0.0   27.4  166     -1
'OSBLR6'  0.0   27.4  131    -39
'OSBLR4'  0.0   27.4  153    -23
'OSBLR3'  0.0   27.4  165    -36
'OSBLR2'  0.0   27.4  164    -50
'OSBLR1'  0.0   27.4  166    -65
'PACKGB'  0.0   22.9  40     -79
0
```

BPIP (Dated: 95086)

DATE : 03/20/02
TIME : 11:03:12
BPIP data for Osceola Power 3/20/02

==========
BPIP PROCESSING INFORMATION:
==========

The ST flag has been set for processing for an ISCST2 run.

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

UTMP is set to UTMN. The input is assumed to be in a local X-Y coordinate system as opposed to a UTM coordinate system. True North is in the positive Y direction.

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

BPIP data for Osceola Power 3/20/02

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

| Stack Name | Stack Height | Stack-Building Base Elevation Differences | GEP** EQN1 | Preliminary* GEP Stack Height Value |
|---|---|---|---|---|
| COGEN | 60.70 | 0.00 | 91.45 | 91.45 |
| OSBLR5A | 27.40 | 0.00 | 91.45 | 91.45 |
| OSBLR5B | 27.40 | 0.00 | 91.45 | 91.45 |
| OSBLR6 | 27.40 | 0.00 | 87.33 | 87.33 |
| OSBLR4 | 27.40 | 0.00 | 90.34 | 90.34 |
| OSBLR3 | 27.40 | 0.00 | 85.07 | 85.07 |
| OSBLR2 | 27.40 | 0.00 | 53.35 | 65.00 |
| OSBLR1 | 27.40 | 0.00 | 53.35 | 65.00 |
| PACKGB | 22.90 | 0.00 | 91.45 | 91.45 |

* Results are based on Determinants 1 & 2 on pages 1 & 2 of the GEP Technical Support Document. Determinant 3 may be investigated for additional stack height credit. Final values result after Determinant 3 has been taken into consideration.
** Results were derived from Equation 1 on page 6 of GEP Technical Support Document. Values have been adjusted for any stack-building base elevation differences.

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

BPIP (Dated: 95086)

DATE : 03/20/02
TIME : 11:03:12

BPIP data for Osceola Power 3/20/02

BPIP output is in meters

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SO BUILDHGT COGEN | 36.58 | 36.58 | 36.58 | 36.58 | 0.00 | 0.00 |
| SO BUILDHGT COGEN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SO BUILDHGT COGEN | 0.00 | 0.00 | 36.58 | 36.58 | 36.58 | 36.58 |
| SO BUILDHGT COGEN | 36.58 | 36.58 | 36.58 | 36.58 | 0.00 | 0.00 |
| SO BUILDHGT COGEN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SO | BUILDHGT | COGEN | 0.00 | 0.00 | 36.58 | 36.58 | 36.58 | 36.58 |
| SO | BUILDWID | COGEN | 45.36 | 47.33 | 47.87 | 46.96 | 0.00 | 0.00 |
| SO | BUILDWID | COGEN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SO | BUILDWID | COGEN | 0.00 | 0.00 | 47.87 | 47.33 | 45.36 | 42.00 |
| SO | BUILDWID | COGEN | 45.36 | 47.33 | 47.87 | 46.96 | 0.00 | 0.00 |
| SO | BUILDWID | COGEN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SO | BUILDWID | COGEN | 0.00 | 0.00 | 47.87 | 47.33 | 45.36 | 42.00 |
| SO | BUILDHGT | OSBLR5A | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 36.58 |
| SO | BUILDHGT | OSBLR5A | 36.58 | 36.58 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR5A | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR5A | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 21.34 |
| SO | BUILDHGT | OSBLR5A | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR5A | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDWID | OSBLR5A | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 40.92 |
| SO | BUILDWID | OSBLR5A | 35.98 | 29.94 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR5A | 105.19 | 100.50 | 92.77 | 82.21 | 73.27 | 70.00 |
| SO | BUILDWID | OSBLR5A | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 102.67 |
| SO | BUILDWID | OSBLR5A | 102.18 | 98.59 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR5A | 105.19 | 100.50 | 92.77 | 82.21 | 73.27 | 70.00 |
| SO | BUILDHGT | OSBLR5B | 21.34 | 0.00 | 0.00 | 0.00 | 21.34 | 36.58 |
| SO | BUILDHGT | OSBLR5B | 36.58 | 36.58 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR5B | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR5B | 21.34 | 0.00 | 0.00 | 0.00 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR5B | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR5B | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDWID | OSBLR5B | 72.06 | 0.00 | 0.00 | 0.00 | 100.04 | 40.92 |
| SO | BUILDWID | OSBLR5B | 35.98 | 29.94 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR5B | 105.19 | 100.50 | 92.77 | 82.21 | 73.27 | 70.00 |
| SO | BUILDWID | OSBLR5B | 72.06 | 0.00 | 0.00 | 0.00 | 100.04 | 102.67 |
| SO | BUILDWID | OSBLR5B | 102.18 | 98.59 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR5B | 105.19 | 100.50 | 92.77 | 82.21 | 73.27 | 70.00 |
| SO | BUILDHGT | OSBLR6 | 0.00 | 0.00 | 0.00 | 0.00 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR6 | 36.58 | 36.58 | 36.58 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR6 | 21.34 | 21.34 | 21.34 | 21.34 | 0.00 | 0.00 |
| SO | BUILDHGT | OSBLR6 | 0.00 | 0.00 | 0.00 | 0.00 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR6 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR6 | 21.34 | 21.34 | 21.34 | 21.34 | 0.00 | 0.00 |
| SO | BUILDWID | OSBLR6 | 0.00 | 0.00 | 0.00 | 0.00 | 100.04 | 102.67 |
| SO | BUILDWID | OSBLR6 | 33.83 | 29.94 | 23.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR6 | 105.19 | 100.50 | 92.77 | 82.21 | 0.00 | 0.00 |
| SO | BUILDWID | OSBLR6 | 0.00 | 0.00 | 0.00 | 0.00 | 100.04 | 102.67 |
| SO | BUILDWID | OSBLR6 | 102.18 | 98.59 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR6 | 105.19 | 100.50 | 92.77 | 82.21 | 0.00 | 0.00 |
| SO | BUILDHGT | OSBLR4 | 0.00 | 0.00 | 0.00 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR4 | 36.58 | 36.58 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR4 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR4 | 0.00 | 0.00 | 0.00 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR4 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR4 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDWID | OSBLR4 | 0.00 | 0.00 | 0.00 | 94.37 | 100.04 | 102.67 |
| SO | BUILDWID | OSBLR4 | 35.84 | 29.94 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR4 | 105.19 | 100.50 | 92.77 | 82.21 | 73.27 | 70.00 |
| SO | BUILDWID | OSBLR4 | 0.00 | 0.00 | 0.00 | 94.37 | 100.04 | 102.67 |
| SO | BUILDWID | OSBLR4 | 102.18 | 98.59 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR4 | 105.19 | 100.50 | 92.77 | 82.21 | 73.27 | 70.00 |
| SO | BUILDHGT | OSBLR3 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR3 | 36.58 | 36.58 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR3 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR3 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR3 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDHGT | OSBLR3 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 | 21.34 |
| SO | BUILDWID | OSBLR3 | 72.06 | 74.69 | 85.84 | 94.37 | 100.04 | 102.67 |
| SO | BUILDWID | OSBLR3 | 32.32 | 29.94 | 92.00 | 99.98 | 104.92 | 106.67 |
| SO | BUILDWID | OSBLR3 | 105.19 | 100.50 | 92.77 | 82.21 | 73.27 | 70.00 |

```
SO BUILDWID OSBLR3     72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR3    102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR3    105.19  100.50   92.77   82.21   73.27   70.00

SO BUILDHGT OSBLR2     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID OSBLR2     72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR2    102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR2    105.19  100.50   92.77   82.21   73.27   70.00
SO BUILDWID OSBLR2     72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR2    102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR2    105.19  100.50   92.77   82.21   73.27   70.00

SO BUILDHGT OSBLR1     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR1     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR1     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR1     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR1     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR1     21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID OSBLR1     72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR1    102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR1    105.19  100.50   92.77   82.21   73.27   70.00
SO BUILDWID OSBLR1     72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR1    102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR1    105.19  100.50   92.77   82.21   73.27   70.00

SO BUILDHGT PACKGB      0.00    0.00    0.00    0.00    0.00   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58   36.58   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58    0.00    0.00
SO BUILDHGT PACKGB      0.00    0.00    0.00    0.00    0.00   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58   36.58   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58    0.00    0.00
SO BUILDWID PACKGB      0.00    0.00    0.00    0.00    0.00   40.92
SO BUILDWID PACKGB     35.98   29.94   23.00   29.94   35.98   40.92
SO BUILDWID PACKGB     44.62   46.96   47.87   47.33    0.00    0.00
SO BUILDWID PACKGB      0.00    0.00    0.00    0.00    0.00   40.92
SO BUILDWID PACKGB     35.98   29.94   23.00   29.94   35.98   40.92
SO BUILDWID PACKGB     44.62   46.96   47.87   47.33    0.00    0.00
```

ISCBOB3R RELEASE 00285

ISCST3 OUTPUT FILE NUMBER 1 :SOAQ24.o87
ISCST3 OUTPUT FILE NUMBER 2 :SOAQ24.o88
ISCST3 OUTPUT FILE NUMBER 3 :SOAQ24.o89
ISCST3 OUTPUT FILE NUMBER 4 :SOAQ24.o90
ISCST3 OUTPUT FILE NUMBER 5 :SOAQ24.o91
First title for last output file is: 1987 SO2 ANNUAL OSCEOLA FARMS 3/21/02
Second title for last output file is: 100 PERCENT LOAD FOR BOILERS AAQS SCREENING ANALYSIS, ON-CROP

| AVERAGING TIME | YEAR | CONC (ug/m3) | DIRECTION (degree) | DISTANCE (m) | PERIOD ENDING (YYMMDDHH) |
|---|---|---|---|---|---|
| SOURCE GROUP ID: ALL | | | | | |
| HIGH 24-Hour | | | | | |
| | 1987 | 150.662 | 290. | 4000. | 87012624 |
| | 1988 | 148.264 | 260. | 4000. | 88121724 |
| | 1989 | 149.293 | 270. | 4000. | 89022224 |
| | 1990 | 143.782 | 240. | 4000. | 90110524 |
| | 1991 | 166.465 | 300. | 4000. | 91042124 |
| HSH 24-Hour | | | | | |
| | 1987 | 122.250 | 280. | 4000. | 87011124 |
| | 1988 | 148.013 | 260. | 4000. | 88031524 |
| | 1989 | 133.127 | 260. | 4000. | 89120424 |
| | 1990 | 109.507 | 230. | 4000. | 90121124 |
| | 1991 | 119.683 | 250. | 4000. | 91031024 |

All receptor computations reported with respect to a user-specified origin

| | | |
|---|---|---|
| GRID | 0.00 | 0.00 |
| DISCRETE | 0.00 | 0.00 |

```
CO STARTING
CO TITLEONE 1987 SO2 ANNUAL OSCEOLA FARMS     3/21/02
CO TITLETWO 100 PERCENT LOAD FOR BOILERS AAQS SCREENING ANALYSIS, ON-CROP SEASON ONLY
CO MODELOPT DFAULT CONC   RURAL NOCMPL
CO AVERTIME 24
CO POLLUTID SO2
CO DCAYCOEF    .000000
CO RUNORNOT RUN
CO FINISHED

SO STARTING

** Source Location Cards:
**          SRCID SRCTYP        XS        YS        ZS
**                              (m)       (m)       (m)
** COGEN STACKS MIDPOINT IS ORIGIN LOCATION
SO LOCATION COGEN    POINT        0         0         0.
SO LOCATION OSBLR2   POINT      164       -50         0.
SO LOCATION OSBLR3   POINT      165       -36         0.
SO LOCATION OSBLR4   POINT      153       -23         0.
SO LOCATION OSBLR5A  POINT      150        -6         0.
SO LOCATION OSBLR5B  POINT      166        -1         0.
SO LOCATION OSBLR6   POINT      131       -39         0.
SO LOCATION PACKGB    POINT       40       -79        0.

**US SUGAR BRYANT
SO LOCATION USSBRY5 POINT   -6600   1700    0
SO LOCATION USBRY123        POINT   -6600   1700    0

**SUGAR CANE GROWERS
SO LOCATION SUGCN12 POINT   -9500   -14100  0
SO LOCATION SUGCN3  POINT   -9500   -14100  0
SO LOCATION SUGCN4  POINT   -9500   -14100  0
SO LOCATION SUGCN5  POINT   -9500   -14100  0
SO LOCATION SUGCN8  POINT   -9500   -14100  0

**PRATT & WHITNEY
SO LOCATION PRATARCH        POINT   17600   -7400   0
SO LOCATION PRATBO12        POINT   17600   -7400   0
SO LOCATION PRATA10 POINT   17600   -7400   0
**BECHTEL INDIANTOWN PSD
SO LOCATION BECHTIND        POINT   1200    24100   0

**ATLANTIC SUGAR
SO LOCATION ATLSUG1 POINT   8500    -22200  0
SO LOCATION ATLSUG2 POINT   8500    -22200  0
SO LOCATION ATLSUG3 POINT   8500    -22200  0
SO LOCATION ATLSUG4 POINT   8500    -22200  0
SO LOCATION ATLSUG5 POINT   8500    -22200  0

**FPL MARTIN
SO LOCATION MART12  POINT   -1300   25500   0
SO LOCATION MARTAUX POINT   -1300   25500   0
SO LOCATION MARTGEN POINT   -1300   25500   0
SO LOCATION MART34  POINT   -1300   25500   0
SO LOCATION MART8   POINT   -1300   25500   0
**EVERGLADES SUGAR MAIN BOILER
SO LOCATION EVERGLAD        POINT   -34800  -13200  0

**US Sugar-Clewiston
**On-crop season future
SO LOCATION USSBRL1N        POINT   -38300  -10500  0
SO LOCATION USSBLR2N        POINT   -38300  -10500  0
SO LOCATION USSBLR3N        POINT   -38300  -10500  0
SO LOCATION USSBLR4N        POINT   -38300  -10500  0
SO LOCATION USSBLR7N        POINT   -38300  -10500  0
**Off-crop season future
SO LOCATION USSBRL1F        POINT   -38300  -10500  0
SO LOCATION USSBLR2F        POINT   -38300  -10500  0
SO LOCATION USSBLR3F        POINT   -38300  -10500  0
SO LOCATION USSBLR4F        POINT   -38300  -10500  0
SO LOCATION USSBLR7F        POINT   -38300  -10500  0

**PALM BEACH CO RR
```

```
SO LOCATION PBCRRF  POINT   41400   -7200   0

**FPL RIVERIA
SO LOCATION RIVU34  POINT   49800   -6800   0

**LAKE WORTH UTILITIES
SO LOCATION LAKWTHU3        POINT   48400   -23700  0
SO LOCATION LAKWTHU4        POINT   48400   -23700  0
SO LOCATION LAKWTHU5        POINT   48400   -23700  0
SO LOCATION LAKWTHHR        POINT   48400   -23700  0

**FORT PIERCE UTILITIES
SO LOCATION FTPIER67        POINT   22400   68900   0

**VERO BEACH POWER
SO LOCATION VERBU1  POINT   22700   89100   0
SO LOCATION VERBU2  POINT   22700   89100   0
SO LOCATION VERBU3  POINT   22700   89100   0
SO LOCATION VERBU4  POINT   22700   89100   0
SO LOCATION VERBU5  POINT   22700   89100   0
**SOUTH BROWARD RRF PSD
SO LOCATION SBCRRF  POINT   35200   -84100  0

**FPL LAUDERDALE
SO LOCATION LAUDU45 POINT   35700   -84100  0
SO LOCATION LDGT1_12        POINT   35700   -84100  0
SO LOCATION LDGT1324        POINT   35700   -84100  0

**FPL PORT EVERGLADES
SO LOCATION PTEVU12 POINT   43000   -82100  0
SO LOCATION PTEVU34 POINT   43000   -82100  0
SO LOCATION PTEVGTS POINT   43000   -82100  0

**TECO-PHILLIPS
SO LOCATION TECO1   POINT   -80100  68000   0
SO LOCATION TECO2   POINT   -80100  68000   0

**TARMAC
SO LOCATION TABMC2P POINT   18500   -105700 0
SO LOCATION TARMC3P POINT   18500   -105700 0

**TECOSEBRING/DINNER LAKE
SO LOCATION DINNSB  POINT   -87600  75100   0

**FPL FORT MYERS
SO LOCATION FMYHR1_6        POINT   -122300 -14500  0
SO LOCATION FMYGT112        POINT   -122300 -14500  0

** Source Parameter Cards:
** POINT:   SRCID       QS      HS        TS    VS        DS
**                    (g/s)    (m)       (K)   (m/s)      (m)
** Osceola Current-24-hour
SO SRCPARAM OSBLR2     11.43     27.4    341.0   15.82     1.52
SO SRCPARAM OSBLR3     2.00      27.4    342.0   16.86     1.91
SO SRCPARAM OSBLR4     1.92      27.4    340.0   16.67     1.83
SO SRCPARAM OSBLR5A    5.895     27.4    340.0   16.48     1.52
SO SRCPARAM OSBLR5B    5.895     27.4    341.0   14.52     1.52
SO SRCPARAM OSBLR6     2.59      27.4    341.0   18.19     1.88
SO SRCPARAM COGEN      38.3      61.0     419.3   17.2      2.44
SO SRCPARAM PACKGB     1.471     22.86   483.2   22.86     1.52

**US SUGAR BRYANT
SO SRCPARAM USSBRY5 77.25   42.7    345.0   11.49   2.90
SO SRCPARAM USBRY123  199.71  19.8    342.0   36.40   1.64

**SUGAR CANE GROWERS
SO SRCPARAM SUGCN12 41.20   45.7    339.0   21.75   1.87
SO SRCPARAM SUGCN3  16.20   27.4    339.0   22.25   1.52
SO SRCPARAM SUGCN4  38.20   54.9    339.0   21.73   2.44
SO SRCPARAM SUGCN5  27.90   45.7    339.0   15.94   2.30
SO SRCPARAM SUGCN8  23.50   47.2    339.0   13.62   2.90

**PRATT & WHITNEY
SO SRCPARAM PRATARCH        13.99   15.2    810.9   143.73  0.91
```

```
SO SRCPARAM PRATBO12          0.51     4.6      533.2    6.92     0.76
SO SRCPARAM PRATA10 0.55      5.8      410.9    106.68   4.17
**BECHTEL INDIANTOWN PSD
SO SRCPARAM BECHTIND          75.64    150.9    333.2    30.50    4.88

**ATLANTIC SUGAR
SO SRCPARAM ATLSUG1 16.28     27.4     346.0    17.97    1.83
SO SRCPARAM ATLSUG2 16.28     27.4     350.0    23.36    1.83
SO SRCPARAM ATLSUG3 16.02     27.4     350.0    21.56    1.83
SO SRCPARAM ATLSUG4 16.21     27.4     344.0    25.16    1.83
SO SRCPARAM ATLSUG5 8.04      27.4     339.0    19.24    1.68

**FPL MARTIN
SO SRCPARAM MART12  1743.79           152.1    420.9    21.03    7.99
SO SRCPARAM MARTAUX 12.90     18.3     535.4    15.24    1.10
SO SRCPARAM MARTGEN 0.51      7.6      785.9    39.62    0.30
SO SRCPARAM MART34  470.40    64.9     410.9    18.90    6.10
SO SRCPARAM MART8   12.99     36.6     397.6    13.59    5.79
**EVERGLADES SUGAR MAIN BOILER
SO SRCPARAM EVERGLAD          34.90    21.9     477.0    10.10    1.10

**US Sugar-Clewiston
**On-crop season future
SO SRCPARAM USSBRL1N          73.73    65.0     347.0    15.36    2.44
SO SRCPARAM USSBLR2N          73.44    65.0     338.0    13.86    2.44
SO SRCPARAM USSBLR3N          47.08    65.0     333.2    6.78     2.44
SO SRCPARAM USSBLR4N          3.68     45.7     344.3    20.28    2.51
SO SRCPARAM USSBLR7N          12.65    68.6     405.4    20.77    2.59
**Off-crop season future
SO SRCPARAM USSBRL1F          24.29    65.0     347.0    14.05    2.44
SO SRCPARAM USSBLR2F          24.02    65.0     338.0    12.68    2.44
SO SRCPARAM USSBLR3F          30.20    65.0     333.2    6.20     2.44
SO SRCPARAM USSBLR4F          0.00     45.7     344.3    0.00     2.51
SO SRCPARAM USSBLR7F          15.81    68.6     405.4    23.60    2.59

**PALM BEACH CO RR
SO SRCPARAM PBCRRF  85.05     76.2     505.2    24.90    2.04

**FPL RIVERIA
SO SRCPARAM RIVU34  2113.65           90.8     401.5    18.90    4.88

**LAKE WORTH UTILITIES
SO SRCPARAM LAKWTHU3          103.95   38.1     408.2    7.71     2.13
SO SRCPARAM LAKWTHU4          129.85   35.1     418.2    17.00    2.29
SO SRCPARAM LAKWTHU5          11.59    22.9     450.4    18.29    0.94
SO SRCPARAM LAKWTHHR          12.79    45.7     377.6    13.74    5.49

**FORT PIERCE UTILITIES
SO SRCPARAM FTPIER67          77.87    45.7     408.2    12.50    2.19

**VERO BEACH POWER
SO SRCPARAM VERBU1  28.77     61.0     437.0    32.42    1.07
SO SRCPARAM VERBU2  84.21     61.0     434.3    37.57    1.07
SO SRCPARAM VERBU3  142.07    61.0     440.4    19.93    1.83
SO SRCPARAM VERBU4  69.05     61.0     425.4    24.36    2.13
SO SRCPARAM VERBU5  15.50     38.1     416.5    19.56    3.35
**SOUTH BROWARD RRF PSD
SO SRCPARAM SBCRRF  37.91     59.4     381.0    18.01    3.96

**FPL LAUDERDALE
SO SRCPARAM LAUDU45 271.15    45.7     438.7    14.60    5.49
SO SRCPARAM LDGT1_12          552.80   13.7     733.2    114.31   2.37
SO SRCPARAM LDGT1324          552.80   13.4     733.2    28.43    4.75

**FPL PORT EVERGLADES
SO SRCPARAM PTEVU12 1593.90           104.5    415.9    26.72    4.27
SO SRCPARAM PTEVU34 2772.00           104.5    414.8    23.88    5.52
SO SRCPARAM PTEVGTS 530.70    13.4     733.2    28.43    4.75

**TECO-PHILLIPS
SO SRCPARAM TECO1   28.98     45.7     441.0    24.08    1.83
SO SRCPARAM TECO2   28.98     45.7     450.0    24.08    1.83

**TARMAC
```

```
SO SRCPARAM TABMC2P 24.57   61.0    422.0   9.10    2.44
SO SRCPARAM TARMC3P 51.43   61.0    450.0   11.04   4.57

**TECOSEBRING/DINNER LAKE
SO SRCPARAM DINNSB  37.78   22.9    394.3   5.79    1.83

**FPL FORT MYERS
SO SRCPARAM FMYHR1_6        3.86    38.1    377.6   14.20   5.79
SO SRCPARAM FMYGT112        649.20  9.8     797.0   35.70   4.42


SO BUILDHGT COGEN      36.58   36.58   36.58   36.58    0.00    0.00
SO BUILDHGT COGEN       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT COGEN       0.00    0.00   36.58   36.58   36.58   36.58
SO BUILDHGT COGEN      36.58   36.58   36.58   36.58    0.00    0.00
SO BUILDHGT COGEN       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT COGEN       0.00    0.00   36.58   36.58   36.58   36.58
SO BUILDWID COGEN      45.36   47.33   47.87   46.96    0.00    0.00
SO BUILDWID COGEN       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID COGEN       0.00    0.00   47.87   47.33   45.36   42.00
SO BUILDWID COGEN      45.36   47.33   47.87   46.96    0.00    0.00
SO BUILDWID COGEN       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID COGEN       0.00    0.00   47.87   47.33   45.36   42.00

SO BUILDHGT PACKGB      0.00    0.00    0.00    0.00    0.00   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58   36.58   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58    0.00    0.00
SO BUILDHGT PACKGB      0.00    0.00    0.00    0.00    0.00   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58   36.58   36.58
SO BUILDHGT PACKGB     36.58   36.58   36.58   36.58    0.00    0.00
SO BUILDWID PACKGB      0.00    0.00    0.00    0.00    0.00   40.92
SO BUILDWID PACKGB     35.98   29.94   23.00   29.94   35.98   40.92
SO BUILDWID PACKGB     44.62   46.96   47.87   47.33    0.00    0.00
SO BUILDWID PACKGB      0.00    0.00    0.00    0.00    0.00   40.92
SO BUILDWID PACKGB     35.98   29.94   23.00   29.94   35.98   40.92
SO BUILDWID PACKGB     44.62   46.96   47.87   47.33    0.00    0.00

SO BUILDHGT OSBLR2      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR2      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID OSBLR2      72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR2     102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR2     105.19  100.50   92.77   82.21   73.27   70.00
SO BUILDWID OSBLR2      72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR2     102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR2     105.19  100.50   92.77   82.21   73.27   70.00

SO BUILDHGT OSBLR3      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR3      36.58   36.58   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR3      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR3      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR3      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR3      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID OSBLR3      72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR3      32.32   29.94   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR3     105.19  100.50   92.77   82.21   73.27   70.00
SO BUILDWID OSBLR3      72.06   74.69   85.84   94.37  100.04  102.67
SO BUILDWID OSBLR3     102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR3     105.19  100.50   92.77   82.21   73.27   70.00

SO BUILDHGT OSBLR4       0.00    0.00    0.00   21.34   21.34   21.34
SO BUILDHGT OSBLR4      36.58   36.58   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR4      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR4       0.00    0.00    0.00   21.34   21.34   21.34
SO BUILDHGT OSBLR4      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR4      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID OSBLR4       0.00    0.00    0.00   94.37  100.04  102.67
SO BUILDWID OSBLR4      35.84   29.94   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR4     105.19  100.50   92.77   82.21   73.27   70.00
SO BUILDWID OSBLR4       0.00    0.00    0.00   94.37  100.04  102.67
```

```
SO BUILDWID OSBLR4      102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR4      105.19  100.50   92.77   82.21   73.27   70.00

SO BUILDHGT OSBLR5A       0.00    0.00    0.00    0.00    0.00   36.58
SO BUILDHGT OSBLR5A      36.58   36.58   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR5A      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR5A       0.00    0.00    0.00    0.00    0.00   21.34
SO BUILDHGT OSBLR5A      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR5A      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID OSBLR5A       0.00    0.00    0.00    0.00    0.00   40.92
SO BUILDWID OSBLR5A      35.98   29.94   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR5A     105.19  100.50   92.77   82.21   73.27   70.00
SO BUILDWID OSBLR5A       0.00    0.00    0.00    0.00    0.00  102.67
SO BUILDWID OSBLR5A     102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR5A     105.19  100.50   92.77   82.21   73.27   70.00

SO BUILDHGT OSBLR5B      21.34    0.00    0.00    0.00   21.34   36.58
SO BUILDHGT OSBLR5B      36.58   36.58   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR5B      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR5B      21.34    0.00    0.00    0.00   21.34   21.34
SO BUILDHGT OSBLR5B      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR5B      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDWID OSBLR5B      72.06    0.00    0.00    0.00  100.04   40.92
SO BUILDWID OSBLR5B      35.98   29.94   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR5B     105.19  100.50   92.77   82.21   73.27   70.00
SO BUILDWID OSBLR5B      72.06    0.00    0.00    0.00  100.04  102.67
SO BUILDWID OSBLR5B     102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR5B     105.19  100.50   92.77   82.21   73.27   70.00


SO BUILDHGT OSBLR6       0.00    0.00    0.00    0.00   21.34   21.34
SO BUILDHGT OSBLR6      36.58   36.58   36.58   21.34   21.34   21.34
SO BUILDHGT OSBLR6      21.34   21.34   21.34   21.34    0.00    0.00
SO BUILDHGT OSBLR6       0.00    0.00    0.00    0.00   21.34   21.34
SO BUILDHGT OSBLR6      21.34   21.34   21.34   21.34   21.34   21.34
SO BUILDHGT OSBLR6      21.34   21.34   21.34   21.34    0.00    0.00
SO BUILDWID OSBLR6       0.00    0.00    0.00    0.00  100.04  102.67
SO BUILDWID OSBLR6      33.83   29.94   23.00   99.98  104.92  106.67
SO BUILDWID OSBLR6     105.19  100.50   92.77   82.21    0.00    0.00
SO BUILDWID OSBLR6       0.00    0.00    0.00    0.00  100.04  102.67
SO BUILDWID OSBLR6     102.18   98.59   92.00   99.98  104.92  106.67
SO BUILDWID OSBLR6     105.19  100.50   92.77   82.21    0.00    0.00

** SOURCES THAT OPERATE DURING THE ON-CROP SEASON
SO EMISFACT   OSBLR2-OSBLR6  MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT OSBLR5A-OSBLR5B  MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT USSBRY5   MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT USBRY123  MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT SUGCN12   MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT SUGCN3    MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT SUGCN4    MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT SUGCN5    MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT SUGCN8    MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT ATLSUG1   MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT ATLSUG2   MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT ATLSUG3   MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT ATLSUG4   MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT USSBRL1N  MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT USSBLR2N  MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT USSBLR3N  MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT USSBLR4N  MONTH 1 1 1 1 0 0 0 0 0 1 1 1
SO EMISFACT USSBLR7N  MONTH 1 1 1 1 0 0 0 0 0 1 1 1

**SOURCES THAT OPERATE DURING THE OFF-CROP SEASON
SO EMISFACT USSBRL1F  MONTH 0 0 0 0 1 1 1 1 1 0 0 0
SO EMISFACT USSBLR2F  MONTH 0 0 0 0 1 1 1 1 1 0 0 0
SO EMISFACT USSBLR3F  MONTH 0 0 0 0 1 1 1 1 1 0 0 0
SO EMISFACT USSBLR4F  MONTH 0 0 0 0 1 1 1 1 1 0 0 0
SO EMISFACT USSBLR7F  MONTH 0 0 0 0 1 1 1 1 1 0 0 0

SO EMISUNIT    .100000E+07 (GRAMS/SEC)          (MICROGRAMS/CUBIC-METER)
SO SRCGROUP ALL
SO FINISHED
```

```
RE STARTING
RE GRIDPOLR POL STA
RE GRIDPOLR POL ORIG   0.0   0.0
RE GRIDPOLR POL DIST  4000
RE GRIDPOLR POL GDIR   36  10.00  10.00
RE GRIDPOLR POL END
**  FENCELINE RECEPTORS AT 100-M INTERVALS
RE DISCCART    -1219.2    2987.0
RE DISCCART    -1119.2    2987.0
RE DISCCART    -1019.2    2987.0
RE DISCCART     -919.2    2987.0
RE DISCCART     -819.2    2987.0
RE DISCCART     -719.2    2987.0
RE DISCCART     -619.2    2987.0
RE DISCCART     -519.2    2987.0
RE DISCCART     -419.2    2987.0
RE DISCCART     -319.2    2987.0
RE DISCCART     -219.2    2987.0
RE DISCCART     -119.2    2987.0
RE DISCCART      -19.2    2987.0
RE DISCCART       80.8    2987.0
RE DISCCART      180.8    2987.0
RE DISCCART      280.8    2987.0
RE DISCCART      380.8    2987.0
RE DISCCART      480.8    2987.0
RE DISCCART      580.8    2987.0
RE DISCCART      680.8    2987.0
RE DISCCART      780.8    2987.0
RE DISCCART      880.8    2987.0
RE DISCCART      980.8    2987.0
RE DISCCART     1080.8    2987.0
RE DISCCART     1180.8    2987.0
RE DISCCART     1280.8    2987.0
RE DISCCART     1380.8    2987.0
RE DISCCART     1480.8    2987.0
RE DISCCART     1580.8    2987.0
RE DISCCART     1680.8    2987.0
RE DISCCART     1780.8    2987.0
RE DISCCART     1880.8    2987.0
RE DISCCART     1980.8    2987.0
RE DISCCART     2080.8    2987.0
RE DISCCART     2180.8    2987.0
RE DISCCART     2280.8    2987.0
RE DISCCART     2380.8    2987.0
RE DISCCART     2480.8    2987.0
RE DISCCART     2580.8    2987.0
RE DISCCART     2680.8    2987.0
RE DISCCART     2743.2    2949.4
RE DISCCART     2743.2    2849.4
RE DISCCART     2743.2    2749.4
RE DISCCART     2743.2    2649.4
RE DISCCART     2743.2    2549.4
RE DISCCART     2743.2    2449.4
RE DISCCART     2743.2    2349.4
RE DISCCART     2743.2    2249.4
RE DISCCART     2743.2    2149.4
RE DISCCART     2743.2    2049.4
RE DISCCART     2743.2    1949.4
RE DISCCART     2743.2    1849.4
RE DISCCART     2743.2    1749.4
RE DISCCART     2743.2    1649.4
RE DISCCART     2743.2    1549.4
RE DISCCART     2743.2    1449.4
RE DISCCART     2743.2    1349.4
RE DISCCART     2743.2    1249.4
RE DISCCART     2673.4    1219.2
RE DISCCART     2573.4    1219.2
RE DISCCART     2473.4    1219.2
RE DISCCART     2373.4    1219.2
RE DISCCART     2273.4    1219.2
RE DISCCART     2173.4    1219.2
RE DISCCART     2073.4    1219.2
RE DISCCART     1973.4    1219.2
RE DISCCART     1950.7    1141.9
```

```
RE DISCCART     1950.7    1041.9
RE DISCCART     1950.7     941.9
RE DISCCART     1950.7     841.9
RE DISCCART     1950.7     741.9
RE DISCCART     1950.7     641.9
RE DISCCART     1950.7     541.9
RE DISCCART     1950.7     441.9
RE DISCCART     1950.7     341.9
RE DISCCART     1950.7     241.9
RE DISCCART     1950.7     141.9
RE DISCCART     1950.7      41.9
RE DISCCART     1950.7     -58.1
RE DISCCART     1950.7    -158.1
RE DISCCART     2025.9    -182.9
RE DISCCART     2125.9    -182.9
RE DISCCART     2225.9    -182.9
RE DISCCART     2316.5    -192.3
RE DISCCART     2316.5    -292.3
RE DISCCART     2316.5    -392.3
RE DISCCART     2316.5    -492.3
RE DISCCART     2316.5    -592.3
RE DISCCART     2316.5    -692.3
RE DISCCART     2316.5    -792.3
RE DISCCART     2316.5    -892.3
RE DISCCART     2316.5    -992.3
RE DISCCART     2248.3   -1024.1
RE DISCCART     2148.3   -1024.1
RE DISCCART     2048.3   -1024.1
RE DISCCART     1948.3   -1024.1
RE DISCCART     1848.3   -1024.1
RE DISCCART     1748.3   -1024.1
RE DISCCART     1648.3   -1024.1
RE DISCCART     1548.3   -1024.1
RE DISCCART     1448.3   -1024.1
RE DISCCART     1348.3   -1024.1
RE DISCCART     1249.7   -1025.5
RE DISCCART     1249.7   -1125.5
RE DISCCART     1249.7   -1225.5
RE DISCCART     1249.7   -1325.5
RE DISCCART     1249.7   -1425.5
RE DISCCART     1249.7   -1525.5
RE DISCCART     1249.7   -1625.5
RE DISCCART     1249.7   -1725.5
RE DISCCART     1192.0   -1767.8
RE DISCCART     1092.0   -1767.8
RE DISCCART      992.0   -1767.8
RE DISCCART      892.0   -1767.8
RE DISCCART      792.0   -1767.8
RE DISCCART      692.0   -1767.8
RE DISCCART      592.0   -1767.8
RE DISCCART      492.0   -1767.8
RE DISCCART      392.0   -1767.8
RE DISCCART      365.8   -1694.1
RE DISCCART      365.8   -1594.1
RE DISCCART      365.8   -1494.1
RE DISCCART      365.8   -1394.1
RE DISCCART      365.8   -1294.1
RE DISCCART      365.8   -1194.1
RE DISCCART      365.8   -1094.1
RE DISCCART      335.7   -1024.1
RE DISCCART      235.7   -1024.1
RE DISCCART      135.7   -1024.1
RE DISCCART       35.7   -1024.1
RE DISCCART      -64.3   -1024.1
RE DISCCART     -164.3   -1024.1
RE DISCCART     -264.3   -1024.1
RE DISCCART     -364.3   -1024.1
RE DISCCART     -464.3   -1024.1
RE DISCCART     -564.3   -1024.1
RE DISCCART     -664.3   -1024.1
RE DISCCART     -764.3   -1024.1
RE DISCCART     -864.3   -1024.1
RE DISCCART     -964.3   -1024.1
RE DISCCART    -1064.3   -1024.1
```

```
RE DISCCART    -1164.3   -1024.1
RE DISCCART    -1219.2    -979.0
RE DISCCART    -1219.2    -879.0
RE DISCCART    -1219.2    -779.0
RE DISCCART    -1219.2    -679.0
RE DISCCART    -1219.2    -579.0
RE DISCCART    -1219.2    -479.0
RE DISCCART    -1219.2    -379.0
RE DISCCART    -1219.2    -279.0
RE DISCCART    -1219.2    -179.0
RE DISCCART    -1219.2     -79.0
RE DISCCART    -1219.2      21.0
RE DISCCART    -1219.2     121.0
RE DISCCART    -1219.2     221.0
RE DISCCART    -1219.2     321.0
RE DISCCART    -1219.2     421.0
RE DISCCART    -1219.2     521.0
RE DISCCART    -1219.2     621.0
RE DISCCART    -1219.2     721.0
RE DISCCART    -1219.2     821.0
RE DISCCART    -1219.2     921.0
RE DISCCART    -1219.2    1021.0
RE DISCCART    -1219.2    1121.0
RE DISCCART    -1219.2    1221.0
RE DISCCART    -1219.2    1321.0
RE DISCCART    -1219.2    1421.0
RE DISCCART    -1219.2    1521.0
RE DISCCART    -1219.2    1621.0
RE DISCCART    -1219.2    1721.0
RE DISCCART    -1219.2    1821.0
RE DISCCART    -1219.2    1921.0
RE DISCCART    -1219.2    2021.0
RE DISCCART    -1219.2    2121.0
RE DISCCART    -1219.2    2221.0
RE DISCCART    -1219.2    2321.0
RE DISCCART    -1219.2    2421.0
RE DISCCART    -1219.2    2521.0
RE DISCCART    -1219.2    2621.0
RE DISCCART    -1219.2    2721.0
RE DISCCART    -1219.2    2821.0
RE DISCCART    -1219.2    2921.0
RE DISCPOLR COGEN     3000.        70
RE DISCPOLR COGEN     2000.        80
RE DISCPOLR COGEN     3000.        80
RE DISCPOLR COGEN     2000.        90
RE DISCPOLR COGEN     3000.        90
RE DISCPOLR COGEN     3000.       100
RE DISCPOLR COGEN     3000.       110
RE DISCPOLR COGEN     3000.       120
RE DISCPOLR COGEN     2000.       130
RE DISCPOLR COGEN     3000.       130
RE DISCPOLR COGEN     2000.       140
RE DISCPOLR COGEN     3000.       140
RE DISCPOLR COGEN     3000.       150
RE DISCPOLR COGEN     2000.       160
RE DISCPOLR COGEN     3000.       160
RE DISCPOLR COGEN     1200.       170
RE DISCPOLR COGEN     1500.       170
RE DISCPOLR COGEN     2000.       170
RE DISCPOLR COGEN     3000.       170
RE DISCPOLR COGEN     1200.       180
RE DISCPOLR COGEN     1500.       180
RE DISCPOLR COGEN     2000.       180
RE DISCPOLR COGEN     3000.       180
RE DISCPOLR COGEN     1200.       190
RE DISCPOLR COGEN     1500.       190
RE DISCPOLR COGEN     2000.       190
RE DISCPOLR COGEN     3000.       190
RE DISCPOLR COGEN     1200.       200
RE DISCPOLR COGEN     1500.       200
RE DISCPOLR COGEN     2000.       200
RE DISCPOLR COGEN     3000.       200
RE DISCPOLR COGEN     1200.       210
RE DISCPOLR COGEN     1500.       210
```

```
RE DISCPOLR COGEN     2000.       210
RE DISCPOLR COGEN     3000.       210
RE DISCPOLR COGEN     1500.       220
RE DISCPOLR COGEN     2000.       220
RE DISCPOLR COGEN     3000.       220
RE DISCPOLR COGEN     2000.       230
RE DISCPOLR COGEN     3000.       230
RE DISCPOLR COGEN     1500.       240
RE DISCPOLR COGEN     2000.       240
RE DISCPOLR COGEN     3000.       240
RE DISCPOLR COGEN     1500.       250
RE DISCPOLR COGEN     2000.       250
RE DISCPOLR COGEN     3000.       250
RE DISCPOLR COGEN     1500.       260
RE DISCPOLR COGEN     2000.       260
RE DISCPOLR COGEN     3000.       260
RE DISCPOLR COGEN     1500.       270
RE DISCPOLR COGEN     2000.       270
RE DISCPOLR COGEN     3000.       270
RE DISCPOLR COGEN     1500.       280
RE DISCPOLR COGEN     2000.       280
RE DISCPOLR COGEN     3000.       280
RE DISCPOLR COGEN     1500.       290
RE DISCPOLR COGEN     2000.       290
RE DISCPOLR COGEN     3000.       290
RE DISCPOLR COGEN     1500.       300
RE DISCPOLR COGEN     2000.       300
RE DISCPOLR COGEN     3000.       300
RE DISCPOLR COGEN     2000.       310
RE DISCPOLR COGEN     3000.       310
RE DISCPOLR COGEN     2000.       320
RE DISCPOLR COGEN     3000.       320
RE DISCPOLR COGEN     3000.       330
RE DISCPOLR COGEN     3000.       360
RE FINISHED

ME STARTING
ME DAYRANGE 1/1-4/30 10/1-12/31
ME INPUTFIL P:\MET\PBIPBI87.MET
ME ANEMHGHT    33  FEET
ME SURFDATA  12844     1987   WEST-PALM-BCH
ME UAIRDATA  12844     1987   WEST-PALM-BCH
ME FINISHED

OU STARTING
OU RECTABLE ALLAVE FIRST  SECOND
OU FINISHED
```

```
1990 OSCEOLA COGEN IMPACTS AT ENP PSD CLASS I AREA, CURRENT SOURCE    3/28/02
MAXIMUM 24-HOUR E.R., SIGNIFICANT IMPACT ANALYSIS, VISIBILITY ANALYSIS
REFINED ANALYSIS WITH 126 RECEPTORS AT EVERGLADES NP
---------------- Run title (3 lines) ----------------------------------------

                    CALPUFF MODEL CONTROL FILE
                    --------------------------

------------------------------------------------------------------------------

INPUT GROUP: 0 -- Input and Output File Names

     Number of CALMET.DAT files for run (NMETDAT)
                                     Default: 1       ! NMETDAT =   6   !

--------------
Default Name  Type          File Name
------------  ----          ---------
CALMET.DAT    input    * METDAT =              *
    or
ISCMET.DAT    input    * ISCDAT =              *
    or
PLMMET.DAT    input    * PLMDAT =              *
    or
PROFILE.DAT   input    * PRFDAT =              *
SURFACE.DAT   input    * SFCDAT =              *
RESTARTB.DAT  input    * RSTARTB=              *
------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST =PUFCUR24.LST   !
CONC.DAT      output   ! CONDAT =PUFCUR24.CON   !
DFLX.DAT      output   * DFDAT  =              *
WFLX.DAT      output   * WFDAT  =              *

VISB.DAT      output   ! VISDAT =VISCUR.DAT    !
RESTARTE.DAT  output   * RSTARTE=              *
------------------------------------------------------------------------------
Emission Files
--------------
PTEMARB.DAT   input    * PTDAT  =              *
VOLEM.DAT     input    * VOLDAT =              *
BAEMARB.DAT   input    * ARDAT  =              *
LNEMARB.DAT   input    * LNDAT  =              *
------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    ! OZDAT  =O3ENP90.DAT  !
VD.DAT        input    * VDDAT  =              *
CHEM.DAT      input    * CHEMDAT=              *
HILL.DAT      input    * HILDAT=              *
HILLRCT.DAT   input    * RCTDAT=              *
COASTLN.DAT   input    * CSTDAT=              *
FLUXBDY.DAT   input    * BDYDAT=              *
DEBUG.DAT     output   * DEBUG =              *
MASSFLX.DAT   output   * FLXDAT=              *
MASSBAL.DAT   output   * BALDAT=              *
------------------------------------------------------------------------------
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence if NMETDAT>1

Default Name  Type          File Name
------------  ----          ---------
 none         input    ! METDAT=C:\CALMET\ENP\MET0102.DAT     !  !END!
 none         input    ! METDAT=C:\CALMET\ENP\MET0304.DAT     !  !END!
```

```
 none          input    ! METDAT=C:\CALMET\ENP\MET0506.DAT     !  !END!
 none          input    ! METDAT=C:\CALMET\ENP\MET0708.DAT     !  !END!
 none          input    ! METDAT=C:\CALMET\ENP\MET0910.DAT     !  !END!
 none          input    ! METDAT=C:\CALMET\ENP\MET1112.DAT     !  !END!


-------------------------------------------------------------------------------

INPUT GROUP: 1 -- General run control parameters
--------------

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:   Year (IBYR) -- No default       ! IBYR =  1990  !
     (used only if   Month (IBMO) -- No default       ! IBMO =  1  !
      METRUN = 0)      Day (IBDY) -- No default       ! IBDY =  6  !
                      Hour (IBHR) -- No default       ! IBHR =  0  !

     Length of run (hours) (IRLG) -- No default       ! IRLG =  8616  !

     Number of chemical species (NSPEC)
                                   Default: 5       ! NSPEC =   9  !

     Number of chemical species
     to be emitted  (NSE)          Default: 3       ! NSE =  7   !

     Flag to stop run after
     SETUP phase (ITEST)           Default: 2       ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)    Default: 0       ! MRESTART =  0   !

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
           2 = Write a restart file during run
           3 = Read a restart file at beginning of run
               and write a restart file during run

        Number of periods in Restart
        output cycle (NRESPD)      Default: 0       ! NRESPD =  0   !

           0 = File written only at last period
          >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                   Default: 1       ! METFM =  1   !

           METFM = 1 - CALMET binary file (CALMET.MET)
           METFM = 2 - ISC ASCII file (ISCMET.MET)
           METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
           METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                   Default: 60.0    ! AVET = 60. !
     PG Averaging Time (minutes) (PGTIME)
                                   Default: 60.0    ! PGTIME = 60. !


!END!
```

---

INPUT GROUP: 2 -- Technical options
---

```
Vertical distribution used in the
near field (MGAUSS)                    Default: 1     ! MGAUSS =  1   !
   0 = uniform
   1 = Gaussian

Terrain adjustment method
(MCTADJ)                               Default: 3     ! MCTADJ =  3   !
   0 = no adjustment
   1 = ISC-type of terrain adjustment
   2 = simple, CALPUFF-type of terrain
       adjustment
   3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG)                           Default: 0     ! MCTSG =  0   !
   0 = not modeled
   1 = modeled

Near-field puffs modeled as
elongated 0 (MSLUG)                    Default: 0     ! MSLUG =  0   !
   0 = no
   1 = yes (slug model used)

Transitional plume rise modeled ?
(MTRANS)                               Default: 1     ! MTRANS =  1   !
   0 = no  (i.e., final rise only)
   1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP)             Default: 1     ! MTIP =  1  !
   0 = no  (i.e., no stack tip downwash)
   1 = yes (i.e., use stack tip downwash)

Vertical wind shear modeled above
stack top? (MSHEAR)                    Default: 0     ! MSHEAR =  1  !
   0 = no  (i.e., vertical wind shear not modeled)
   1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT)       Default: 0     ! MSPLIT =  0  !
   0 = no (i.e., puffs not split)
   1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)        Default: 1     ! MCHEM =  1   !
   0 = chemical transformation not
       modeled
   1 = transformation rates computed
       internally (MESOPUFF II scheme)
   2 = user-specified transformation
       rates used
   3 = transformation rates computed
       internally (RIVAD/ARM3 scheme)

Wet removal modeled ? (MWET)           Default: 1     ! MWET =  1   !
   0 = no
   1 = yes

Dry deposition modeled ? (MDRY)        Default: 1     ! MDRY =  1   !
   0 = no
   1 = yes
   (dry deposition method specified
    for each species in Input Group 3)

Method used to compute dispersion
coefficients (MDISP)                   Default: 3     ! MDISP =  4   !

   1 = dispersion coefficients computed from measured values
       of turbulence, sigma v, sigma w
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
```

```
        (u*, w*, L, etc.)
    3 = PG dispersion coefficients for RURAL areas (computed using
        the ISCST multi-segment approximation) and MP coefficients in
        urban areas
    4 = same as 3 except PG coefficients computed using
        the MESOPUFF II eqns.
    5 = CTDM sigmas used for stable and neutral conditions.
        For unstable conditions, sigmas are computed as in
        MDISP = 3, described above.  MDISP = 5 assumes that
        measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)          Default: 3     ! MTURBVW =  0  !
    1 = use sigma-v or sigma-theta measurements
        from PROFILE.DAT to compute sigma-y
        (valid for METFM = 1, 2, 3, 4)
    2 = use sigma-w measurements
        from PROFILE.DAT to compute sigma-z
        (valid for METFM = 1, 2, 3, 4)
    3 = use both sigma-(v/theta) and sigma-w
        from PROFILE.DAT to compute sigma-y and sigma-z
        (valid for METFM = 1, 2, 3, 4)
    4 = use sigma-theta measurements
        from PLMMET.DAT to compute sigma-y
        (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)                       Default: 3     ! MDISP2 =  4  !
(used only if MDISP = 1 or 5)
    2 = dispersion coefficients from internally calculated
        sigma v, sigma w using micrometeorological variables
        (u*, w*, L, etc.)
    3 = PG dispersion coefficients for RURAL areas (computed using
        the ISCST multi-segment approximation) and MP coefficients in
        urban areas
    4 = same as 3 except PG coefficients computed using
        the MESOPUFF II eqns.

PG sigma-y,z adj. for roughness?       Default: 0     ! MROUGH =  0  !
(MROUGH)
    0 = no
    1 = yes

Partial plume penetration of           Default: 1     ! MPARTL =  1  !
elevated inversion?
(MPARTL)
    0 = no
    1 = yes

Strength of temperature inversion      Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
    0 = no (computed from measured/default gradients)
    1 = yes

PDF used for dispersion under convective conditions?
                                       Default: 0     ! MPDF =  0  !
(MPDF)
    0 = no
    1 = yes

Sub-Grid TIBL module used for shore line?
                                       Default: 0     ! MSGTIBL = 0  !
(MSGTIBL)
    0 = no
    1 = yes

Test options specified to see if
they conform to regulatory
values? (MREG)                         Default: 1     ! MREG =  0   !

    0 = NO checks are made
    1 = Technical options must conform to USEPA values
```

```
                    METFM     1
                    AVET      60. (min)
                    MGAUSS    1
                    MCTADJ    3
                    MTRANS    1
                    MTIP      1
                    MCHEM     1 (if modeling SOx, NOx)
                    MWET      1
                    MDRY      1
                    MDISP     3
                    MROUGH    0
                    MPARTL    1
                    SYTDEP    550. (m)
                    MHFTSZ    0


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 3a, 3b -- Species list
-------------------

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !          !END!
! CSPEC =          SO4 !          !END!
! CSPEC =          NOX !          !END!
! CSPEC =         HNO3 !          !END!
! CSPEC =          NO3 !          !END!
! CSPEC =         PM10 !          !END!
! CSPEC =        H2SO4 !          !END!
! CSPEC =           PB !          !END!
! CSPEC =           FL !          !END!

                                                        Dry                 OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED                NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,                 (0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS         1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE    2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)      3= etc.)

!          SO2  =         1,               1,           1,                  0   !
!          SO4  =         1,               1,           2,                  0   !
!          NOX  =         1,               1,           1,                  0   !
!         HNO3  =         1,               0,           1,                  0   !
!          NO3  =         1,               0,           2,                  0   !
!         PM10  =         1,               1,           2,                  0   !
!        H2SO4  =         1,               1,           0,                  0   !
!           PB  =         1,               1,           0,                  0   !
!           FL  =         1,               1,           0,                  0   !

!END!

-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.


-------------------------------------------------------------------------------
```

INPUT GROUP: 4 -- Grid control parameters
---

METEOROLOGICAL grid:

```
          No. X grid cells (NX)      No default     ! NX =  90   !
          No. Y grid cells (NY)      No default     ! NY =  94   !
       No. vertical layers (NZ)      No default     ! NZ =  9   !

         Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 5. !
                                     Units: km

             Cell face heights
                 (ZFACE(nz+1))       No defaults
                                     Units: m
! ZFACE = 0., 20., 50., 100., 200., 500., 1000., 1500., 2500., 3500. !

          Reference Coordinates
         of SOUTHWEST corner of
               grid cell(1, 1):

          X coordinate (XORIGKM)     No default     ! XORIGKM = 250. !
          Y coordinate (YORIGKM)     No default     ! YORIGKM = 2628. !
                                    Units: km

               UTM zone (IUTMZN)     No default     ! IUTMZN =  17   !

   Reference coordinates of CENTER
       of the domain (used in the
    calculation of solar elevation
                         angles)

          Latitude  (deg.) (XLAT)    No default     ! XLAT  = 26.  !
         Longitude (deg.) (XLONG)    No default     ! XLONG = 81.  !
           Time zone        (XTZ)    No default     ! XTZ   = 5.0  !
     (PST=8, MST=7, CST=6, EST=5)
```

Computational grid:

The computational grid is identical to or a subset of the MET. grid. The lower left (LL) corner of the computational grid is at grid point (IBCOMP, JBCOMP) of the MET. grid. The upper right (UR) corner of the computational grid is at grid point (IECOMP, JECOMP) of the MET. grid. The grid spacing of the computational grid is the same as the MET. grid.

```
X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1   !
          (1 <= IBCOMP <= NX)

Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1   !
          (1 <= JBCOMP <= NY)


X index of UR corner (IECOMP)      No default     ! IECOMP =  90   !
          (1 <= IECOMP <= NX)

Y index of UR corner (JECOMP)      No default     ! JECOMP =  94   !
          (1 <= JECOMP <= NY)
```

SAMPLING GRID (GRIDDED RECEPTORS):

The lower left (LL) corner of the sampling grid is at grid point (IBSAMP, JBSAMP) of the MET. grid. The upper right (UR) corner of the sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid. The sampling grid must be identical to or a subset of the computational grid. It may be a nested grid inside the computational grid. The grid spacing of the sampling grid is DGRIDKM/MESHDN.

```
Logical flag indicating if gridded
receptors are used (LSAMP)         Default: T     ! LSAMP = F !
```

```
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1   !
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1   !
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =  90   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =  94   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1  !
        (MESHDN is an integer >= 1)

!END!

------------------------------------------------------------------------------


INPUT GROUP: 5 -- Output Options
--------------
                                          *                           *
     FILE                     DEFAULT VALUE              VALUE THIS RUN
     ----                     -------------              --------------

   Concentrations (ICON)              1                   !  ICON =  1   !
   Dry Fluxes (IDRY)                  1                   !  IDRY =  0   !
   Wet Fluxes (IWET)                  1                   !  IWET =  0   !
   Relative Humidity (IVIS)           1                   !  IVIS =  1   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                            Default: T        ! LCOMPRS = F !

   *
    0 = Do not create file, 1 = create file


    DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

       Mass flux across specified boundaries
       for selected species reported hourly?
       (IMFLX)                          Default: 0        ! IMFLX =  0  !
         0 = no
         1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
                  are specified in Input Group 0)

       Mass balance for each species
       reported hourly?
       (IMBAL)                          Default: 0        ! IMBAL =  0  !
         0 = no
         1 = yes (MASSBAL.DAT filename is
              specified in Input Group 0)


    LINE PRINTER OUTPUT OPTIONS:

       Print concentrations (ICPRT)     Default: 0        ! ICPRT =  0   !
       Print dry fluxes (IDPRT)         Default: 0        ! IDPRT =  0   !
       Print wet fluxes (IWPRT)         Default: 0        ! IWPRT =  0   !
       (0 = Do not print, 1 = Print)

       Concentration print interval
       (ICFRQ) in hours                 Default: 1        ! ICFRQ =  24   !
       Dry flux print interval
       (IDFRQ) in hours                 Default: 1        ! IDFRQ =  1   !
```

```
      Wet flux print interval
      (IWFRQ) in hours                Default: 1         ! IWFRQ =  1   !

      Units for Line Printer Output
      (IPRTU)                         Default: 1         ! IPRTU =  3   !
                     for            for
                 Concentration    Deposition
          1 =       g/m**3         g/m**2/s
          2 =      mg/m**3        mg/m**2/s
          3 =      ug/m**3        ug/m**2/s
          4 =      ng/m**3        ng/m**2/s
          5 =     Odour Units

      Messages tracking progress of   Default: 1         ! IMESG =  1   !
      run written to the screen ?
      (IMESG) -- 0=no, 1=yes


    SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                  ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -
   SPECIES
   /GROUP         PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   S
   -------        ------------------------   ------------------------   ------------------------   -
!          SO2 =     0,           1,           0,           0,           0,           0,
!          SO4 =     0,           1,           0,           0,           0,           0,
!          NOX =     0,           1,           0,           0,           0,           0,
!         HNO3 =     0,           1,           0,           0,           0,           0,
!          NO3 =     0,           1,           0,           0,           0,           0,
!         PM10 =     0,           1,           0,           0,           0,           0,
!        H2SO4 =     0,           1,           0,           0,           0,           0,
!           PB =     0,           1,           0,           0,           0,           0,
!           FL =     0,           1,           0,           0,           0,           0,

    OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

      Logical for debug output
      (LDEBUG)                                Default: F     ! LDEBUG = F !

      First puff to track
      (IPFDEB)                                Default: 1     ! IPFDEB =  1  !

      Number of puffs to track
      (NPFDEB)                                Default: 1     ! NPFDEB =  1  !

      Met. period to start output
      (NN1)                                   Default: 1     ! NN1 =  1   !

      Met. period to end output
      (NN2)                                   Default: 10    ! NN2 =  10  !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

---------------
Subgroup (6a)
---------------
      Number of terrain features (NHILL)      Default: 0     ! NHILL =  0   !

      Number of special complex terrain
      receptors  (NCTREC)                     Default: 0     ! NCTREC =  0   !

      Terrain and CTSG Receptor data for
      CTSG hills input in CTDM format ?
      (MHILL)                                 No Default     ! MHILL =  0   !
      1 = Hill and Receptor data created
          by CTDM processors & read from
          HILL.DAT and HILLRCT.DAT files
```

```
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1. !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1. !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0.0E00 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information

HILL          XC        YC       THETAH  ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2
 NO.         (km)      (km)      (deg.)   (m)    (m)       (m)       (m)       (m)        (m)
----         ----      ----      ------  -----  ------    ------    ------   -------    -------

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT        YRCT        ZRCT         XHH
                      (km)        (km)        (m)
                     ------      -----      ------        ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a separate
           input subgroup and therefore must end with an input group terminator.

-------------------------------------------------------------------------------


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE     HENRY'S L
```

```
       NAME        (cm**2/s)                                          (s/cm)                (dime
      -------     -----------      ----------      ----------    --------------------     ---------

!          SO2 =     0.1509,         1000.,            8.,                0.,                  0.04
!          NOX =     0.1656,            1.,            8.,                5.,                   3.5
!         HNO3 =     0.1628,            1.,           18.,                0.,            0.00000008

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                  DEVIATION
                        (microns)                 (microns)
      -------      ------------------        ------------------
!          SO4 =         0.48,                      2.   !
!          NO3 =         0.48,                      2.   !
!         PM10 =         0.48,                      2.   !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30. !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10. !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8. !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                           Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,              0.0E00 !
```

```
!          SO4 =          1.0E-04,              3.0E-05 !
!         HNO3 =          6.0E-05,               0.0E00 !
!          NO3 =          1.0E-04,              3.0E-05 !
!         PM10 =          1.0E-04,              3.0E-05 !

!END!

------------------------------------------------------------------------------


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Ozone data input option (MOZ)     Default: 1            ! MOZ =  1   !
     (Used only if MCHEM = 1 or 3)
        0 = use a constant background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Background ozone concentration
     (BCKO3) in ppb                    Default: 80.          ! BCKO3 = 80. !
     (Used only if MCHEM = 1 or 3 and
      MOZ = 0 or (MOZ = 1 and all hourly
      O3 data missing)

     Background ammonia concentration
     (BCKNH3) in ppb                   Default: 10.          ! BCKNH3 = 0.5 !

     Nighttime SO2 loss rate (RNITE1)
     in percent/hour                   Default: 0.2          ! RNITE1 = 0.2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                   Default: 2.0          ! RNITE2 = 2. !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                   Default: 2.0          ! RNITE3 = 2. !

!END!

------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP = 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                  Default: 0      ! MHFTSZ =  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                              Default: 5      ! JSUP =  5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1 = 0.01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                   Default: 0.1    ! CONK2 = 0.1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                     Default: 0.5    ! TBD = 0.5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point
```

```
Range of land use categories for which
urban dispersion is assumed
(IURB1, IURB2)                          Default: 10     ! IURB1 =  10  !
                                                 19     ! IURB2 =  19  !

Site characterization parameters for single-point Met data files ---------
(needed for METFM = 2,3,4)

   Land use category for modeling domain
   (ILANDUIN)                           Default: 20     ! ILANDUIN =  20  !

   Roughness length (m) for modeling domain
   (Z0IN)                               Default: 0.25   ! Z0IN = 0.25 !

   Leaf area index for modeling domain
   (XLAIIN)                             Default: 3.0    ! XLAIIN = 3. !

   Elevation above sea level (m)
   (ELEVIN)                             Default: 0.0    ! ELEVIN = 0. !

   Latitude (degrees) for met location
   (XLATIN)                             Default: -999.  ! XLATIN = -999. !

   Longitude (degrees) for met location
   (XLONIN)                             Default: -999.  ! XLONIN = -999. !

Specialized information for interpreting single-point Met data files -----

   Anemometer height (m) (Used only if METFM = 2,3)
   (ANEMHT)                             Default: 10.    ! ANEMHT = 6.7 !

   Form of lateral turbulance data in PROFILE.DAT file
   (Used only if METFM = 4 or MTURBVW = 1 or 3)
   (ISIGMAV)                            Default: 1      ! ISIGMAV =  2  !
       0 = read sigma-theta
       1 = read sigma-v

   Choice of mixing heights (Used only if METFM = 4)
   (IMIXCTDM)                           Default: 0      ! IMIXCTDM =  0  !
       0 = read PREDICTED mixing heights
       1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                                Default: 1.0    ! XMXLEN = 1. !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                               Default: 1.0    ! XSAMLEN = 1. !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                                 Default: 99     ! MXNEW =  99   !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                 Default: 99     ! MXSAM =  99   !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                                Default: 2      ! NCOUNT =  2   !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                 Default: 1.0    ! SYMIN = 1.  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                 Default: 1.0    ! SZMIN = 1.  !

Default minimum turbulence velocities
sigma-v and sigma-w for each
stability class (m/s)
(SVMIN(6) and SWMIN(6))     Default SVMIN : .50,  .50,  .50,  .50,  .50,  .50
```

```
                                Default SWMIN : .20,  .12,  .08,  .06,  .03,  .016

                              Stability Class :  A     B     C     D     E     F
                                                ---   ---   ---   ---   ---   ---
                                      ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500!
                                      ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                                   Default: 0.0,0.0  ! CDIV = 0., 0. !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                                    Default: 0.5    ! WSCALM = 0.5 !

Maximum mixing height (m)
(XMAXZI)                                    Default: 3000.  ! XMAXZI = 3000. !

Minimum mixing height (m)
(XMINZI)                                    Default: 50.    ! XMINZI = 50. !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                        Default   :
                                  ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10,8 (10.8+)

                            Wind Speed Class :  1     2     3     4     5     6
                                                ---   ---   ---   ---   ---   ---
                                      ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                         Default   : ISC RURAL values
                                  ISC RURAL : .07, .07, .10, .15, .35, .55
                                  ISC URBAN : .15, .15, .20, .25, .30, .30

                              Stability Class :  A     B     C     D     E     F
                                                ---   ---   ---   ---   ---   ---
                                         ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                         Default: 0.020, 0.035
                                     ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))                      Stability Class :  A     B     C     D     E     F
                                 Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                                ---   ---   ---   ---   ---   ---
                                         !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                                  Default: 10.        ! SL2PF = 10. !

Puff-splitting control variables ------------------------

  Number of puffs that result every time a puff
  is split - nsplit=2 means that 1 puff splits
  into 2
  (NSPLIT)                               Default:   3        ! NSPLIT =  3  !

  Time(s) of a day when split puffs are eligible to
  be split once again; this is typically set once
  per day, around sunset before nocturnal shear develops.
```

```
      24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
      0=do not re-split    1=eligible for re-split
      (IRESPLIT(24))                      Default:  Hour 17 = 1
      !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

      Split is allowed only if last hour's mixing
      height (m) exceeds a minimum value
      (ZISPLIT)                           Default: 100.       ! ZISPLIT = 100. !

      Split is allowed only if ratio of last hour's
      mixing ht to the maximum mixing ht experienced
      by the puff is less than a maximum value (this
      postpones a split until a nocturnal layer develops)
      (ROLDMAX)                           Default: 0.25       ! ROLDMAX = 0.25 !

    Integration control variables ------------------------

      Fractional convergence criterion for numerical SLUG
      sampling integration
      (EPSSLUG)                           Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

      Fractional convergence criterion for numerical AREA
      source integration
      (EPSAREA)                           Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

      Trajectory step-length (m) used for numerical rise
      integration
      (DSRISE)                            Default:   1.0      ! DSRISE = 1. !

!END!


-------------------------------------------------------------------------------


INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
-------------------------------

---------------
Subgroup (13a)
---------------

    Number of point sources with
    parameters provided below      (NPT1)  No default  !  NPT1 = 6  !

    Units used for point source
    emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
          1 =        g/s
          2 =       kg/hr
          3 =       lb/hr
          4 =     tons/yr
          5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
          6 =     Odour Unit * m**3/min
          7 =     metric tons/yr

    Number of source-species
    combinations with variable
    emissions scaling factors
    provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  54 !

    Number of point sources with
    variable emission parameters
    provided in external file      (NPT2)  No default  !  NPT2 =  0  !

    (If NPT2 > 0, these point
    source emissions are read from
    the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
```

a

```
          POINT SOURCE: CONSTANT DATA
          ---------------------------
                                                                                b          c
  Source      X UTM     Y UTM     Stack   Base     Stack    Exit  Exit    Bldg.  Emission
   No.    Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
             (km)      (km)       (m)      (m)       (m)   (m/s) (deg. K)
  ------  ---------- ---------- ------  ------   -------- ----- -------- ----- --------
   1 ! SRCNAM = OSBLR2C !
   1 ! X =    544.2,   2968.0,   27.40,    .0,      1.52, 17.85,  341.0,  1.0, 5.87, 0.4, 5.778,
       0.0E00,  0.0E00, 5.5, 0.36, 7.10E-4, 0.012 !
!END!
   2 ! SRCNAM = OSBLR3C !
   2 ! X =    544.2,   2968.0,   27.40,    .0,      1.91, 14.34,  342.0,  1.0, 6.39, 0.4, 4.525,
       0.0E00,  0.0E00, 4.7, 0.39, 7.60E-4, 0.013 !
!END!
   3 ! SRCNAM = OSBLR4C !
   3 ! X =    544.2,   2968.0,   27.40,    .0,      1.83, 16.53,  340.0,  1.0, 6.11, 0.4, 5.702,
       0.0E00,  0.0E00, 7.44, 0.37, 7.40E-4, 0.012 !
!END!
   4 ! SRCNAM = OSBLR5AC !
   4 ! X =    544.2,   2968.0,   27.40,    .0,      1.52, 16.56,  340.0,  1.0, 3.38, 0.2, 3.299,
       0.0E00,  0.0E00, 2.99, 0.21, 3.65E-4, 0.006 !
!END!
   5 ! SRCNAM = OSBLR5BC !
   5 ! X =    544.2,   2968.0,   27.40,    .0,      1.52, 16.56,  341.0,  1.0, 3.38, 0.2, 3.299,
       0.0E00,  0.0E00, 2.99, 0.21, 3.65E-4, 0.006 !
!END!
   6 ! SRCNAM = OSBLR6C !
   6 ! X =    544.2,   2968.0,   27.40,    .0,      1.88, 11.33,  341.0,  1.0, 2.08, 0.1, 1.555,
       0.0E00,  0.0E00, 4.07, 0.13, 8.80E-4, 0.015 !
!END!

--------
```

a
Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

b
0. = No building downwash modeled, 1. = downwash modeled
NOTE: must be entered as a REAL number (i.e., with decimal point)

c
An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IPTU (e.g. 1 for g/s).

```
---------------
Subgroup (13c)
---------------
          BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
          -------------------------------------------------------
      1  ! SRCNAM = OSBLR2C    !
      1  !  HEIGHT =  21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34 !
      1  !  WIDTH =   72.06,  74.69,  85.84,  94.37, 100.04, 102.67,
                102.18,  98.59,  92.00,  99.98, 104.92, 106.67,
                105.19, 100.50,  92.77,  82.21,  73.27,  70.00,
                 72.06,  74.69,  85.84,  94.37, 100.04, 102.67,
                102.18,  98.59,  92.00,  99.98, 104.92, 106.67,
                105.19, 100.50,  92.77,  82.21,  73.27,  70.00 !

!END!
      2  ! SRCNAM = OSBLR3C    !
      2  !  HEIGHT =  21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 36.58,  36.58,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
```

```
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34 !
      2  !  WIDTH =   72.06,  74.69,  85.84,  94.37, 100.04, 102.67,
                32.32,  29.94,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00,
                72.06,  74.69,  85.84,  94.37, 100.04, 102.67,
               102.18,  98.59,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00 !

!END!
      3  ! SRCNAM = OSBLR4C    !
      3  !  HEIGHT =   0.00,   0.00,   0.00,  21.34,  21.34,  21.34,
                36.58,  36.58,  21.34,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 0.00,   0.00,   0.00,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34 !
      3  !  WIDTH =    0.00,   0.00,   0.00,  94.37, 100.04, 102.67,
                35.84,  29.94,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00,
                 0.00,   0.00,   0.00,  94.37, 100.04, 102.67,
               102.18,  98.59,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00 !

!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  !  HEIGHT =   0.00,   0.00,   0.00,   0.00,   0.00,  36.58,
                36.58,  36.58,  21.34,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                 0.00,   0.00,   0.00,   0.00,   0.00,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34 !
      4  !  WIDTH =    0.00,   0.00,   0.00,   0.00,   0.00,  40.92,
                35.98,  29.94,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00,
                 0.00,   0.00,   0.00,   0.00,   0.00, 102.67,
               102.18,  98.59,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00 !

!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  !  HEIGHT =  21.34,   0.00,   0.00,   0.00,  21.34,  36.58,
                36.58,  36.58,  21.34,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                21.34,   0.00,   0.00,   0.00,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34 !
      5  !  WIDTH =   72.06,   0.00,   0.00,   0.00, 100.04,  40.92,
                35.98,  29.94,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00,
                72.06,   0.00,   0.00,   0.00, 100.04, 102.67,
               102.18,  98.59,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,  73.27,  70.00 !

!END!
      6  ! SRCNAM = OSBLR6C    !
      6  !  HEIGHT =   0.00,   0.00,   0.00,   0.00,  21.34,  21.34,
                36.58,  36.58,  36.58,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,   0.00,   0.00,
                 0.00,   0.00,   0.00,   0.00,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,  21.34,  21.34,
                21.34,  21.34,  21.34,  21.34,   0.00,   0.00 !
      6  !  WIDTH =    0.00,   0.00,   0.00,   0.00, 100.04, 102.67,
                33.83,  29.94,  23.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,   0.00,   0.00,
                 0.00,   0.00,   0.00,   0.00, 100.04, 102.67,
               102.18,  98.59,  92.00,  99.98, 104.92, 106.67,
               105.19, 100.50,  92.77,  82.21,   0.00,   0.00 !

!END!

Source                                                                  a
 No.       Effective building width and height (in meters) every 10 degrees
------     ---------------------------------------------------------------
```

---

a
Each pair of width and height values is treated as a separate input subgroup and therefore must end with an input group terminator.

---
Subgroup (13d)
---

a
POINT SOURCE: VARIABLE EMISSIONS DATA
---

Use this subgroup to describe temporal variations in the emission rates given in 13b. Factors entered multiply the rates in 13b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

```
      0 =       Constant
      1 =       Diurnal cycle (24 scaling factors: hours 1-24)
      2 =       Monthly cycle (12 scaling factors: months 1-12)
      3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                               where first group is DEC-JAN-FEB)
      4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                               first group is Stability Class A,
                               and the speed classes have upper
                               bounds (m/s) defined in Group 12
      5 =       Temperature   (12 scaling factors, where temperature
                               classes have upper bounds (C) of:
                               0, 5, 10, 15, 20, 25, 30, 35, 40,
                               45, 50, 50+)
```

---

```
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! SO2    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! SO2    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! SO2    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! SO2    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! SO2    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! SO2    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! SO4    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! SO4    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
```

```
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! SO4    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! SO4    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! SO4    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! SO4    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! NOX    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! NOX    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! NOX    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! NOX    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! NOX    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! NOX    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! HNO3   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! HNO3   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! HNO3   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! HNO3   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! HNO3   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
```

```
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! HNO3   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! NO3    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! NO3    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! NO3    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! NO3    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! NO3    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! NO3    =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! PM10   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! PM10   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! PM10   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! PM10   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! PM10   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! PM10   =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! H2SO4  =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
```

```
      2  ! H2SO4  =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! H2SO4  =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! H2SO4  =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! H2SO4  =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! H2SO4  =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! PB     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! PB     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! PB     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! PB     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
      5  ! IVARY  =  2   !
      5  ! PB     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! PB     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      1  ! SRCNAM = OSBLR2C    !
      1  ! IVARY  =  2   !
      1  ! FL     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      2  ! SRCNAM = OSBLR3C    !
      2  ! IVARY  =  2   !
      2  ! FL     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      3  ! SRCNAM = OSBLR4C    !
      3  ! IVARY  =  2   !
      3  ! FL     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      4  ! SRCNAM = OSBLR5AC   !
      4  ! IVARY  =  2   !
      4  ! FL     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      5  ! SRCNAM = OSBLR5BC   !
```

```
      5  ! IVARY  =  2   !
      5  ! FL     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                 0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
      6  ! SRCNAM = OSBLR6C    !
      6  ! IVARY  =  2   !
      6  ! FL     =   1.00,   1.00,   1.00,   0.00,   0.00,   0.00,
                 0.00,   0.00,   0.00,   1.00,   1.00,   1.00   !
!END!
```

---

[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

---

INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters

---

Subgroup (14a)

```
     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0   !

     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1  !
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!
```

Subgroup (14b)

AREA SOURCE: CONSTANT DATA[a]

| Source No. | Effect. Height (m) | Base Elevation (m) | Initial Sigma z (m) | Emission Rates[b] |
|---|---|---|---|---|

---

[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

[b] An emission rate must be entered for every pollutant modeled. Enter emission rate of zero for secondary pollutants that are modeled, but not emitted. Units are specified by IARU

(e.g. 1 for g/m**2/s).

---
Subgroup (14c)
---

COORDINATES (UTM-km) FOR EACH VERTEX(4) OF EACH POLYGON
---

| Source No. | Ordered list of X followed by list of Y, grouped by source[a] |
|---|---|

---
[a] Data for each source are treated as a separate input subgroup and therefore must end with an input group terminator.

---
Subgroup (14d)
---

AREA SOURCE: VARIABLE EMISSIONS DATA[a]
---

Use this subgroup to describe temporal variations in the emission rates given in 14b. Factors entered multiply the rates in 14b. Skip sources here that have constant emissions. For more elaborate variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

IVARY determines the type of variation, and is source-specific:
(IVARY) Default: 0

| | | |
|---|---|---|
| 0 = | Constant | |
| 1 = | Diurnal cycle | (24 scaling factors: hours 1-24) |
| 2 = | Monthly cycle | (12 scaling factors: months 1-12) |
| 3 = | Hour & Season | (4 groups of 24 hourly scaling factors, where first group is DEC-JAN-FEB) |
| 4 = | Speed & Stab. | (6 groups of 6 scaling factors, where first group is Stability Class A, and the speed classes have upper bounds (m/s) defined in Group 12 |
| 5 = | Temperature | (12 scaling factors, where temperature classes have upper bounds (C) of: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 50+) |

---
[a] Data for each species are treated as a separate input subgroup and therefore must end with an input group terminator.

---

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---

---
Subgroup (15a)
---

Number of buoyant line sources with variable location and emission parameters (NLN2) No default ! NLN2 = 0 !

(If NLN2 > 0, ALL parameter data for these sources are read from the file: LNEMARB.DAT)

Number of buoyant line sources (NLINES) No default ! NLINES = 0 !

Units used for line source

```
     emissions below                (ILNU)          Default: 1  !  ILNU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)        (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                             Default: 7   ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which                Default: 6   ! NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)                No default   ! XL = 0. !
                                                    (in meters)

        Average building height (HBL)               No default   ! HBL = 0. !
                                                    (in meters)

        Average building width (WBL)                No default   ! WBL = 0. !
                                                    (in meters)

        Average line source width (WML)             No default   ! WML = 0. !
                                                    (in meters)

        Average separation between buildings (DXL)  No default   ! DXL = 0. !
                                                    (in meters)

        Average buoyancy parameter (FPRIMEL)        No default   ! FPRIMEL = 0. !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------
                                                                                a
Source     Beg. X      Beg. Y      End. X     End. Y     Release    Base        Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height    Elevation     Rates
            (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------   ---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                   a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------------
```

```
     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


-------------------------------------------------------------------------------


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !

     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

     Gridded volume source data
     used ? (IGRDVL)                         No default  ! IGRDVL =  0   !
        0 = no
        1 = yes (gridded volume source
            emissions read from the file:
            VOLEM.DAT)

     The following parameters apply to the data in the
     gridded volume source emissions file (VOLEM.DAT)

       -  Effective height of emissions
          (VEFFHT) in meters                 No default  ! VEFFHT =  0. !

       -  Initial sigma y (VSIGYI) in
          meters                             No default  ! VSIGYI =  0. !

       -  Initial sigma z (VSIGZI) in
          meters                             No default  ! VSIGZI =  0. !
```

```
!END!

---------------
Subgroup (16b)
---------------
                                        a
          VOLUME SOURCE: CONSTANT DATA
          ----------------------------
                                                                          b
       X UTM      Y UTM      Effect.    Base     Initial    Initial    Emission
    Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z     Rates
       (km)       (km)        (m)       (m)        (m)        (m)
    ----------  ----------   ------    ------   --------   --------   --------

--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                            a
         VOLUME SOURCE: VARIABLE EMISSIONS DATA
         --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEM.DAT and IGRDVL = 1.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


-------------------------------------------------------------------------------

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
----------------------

---------------
Subgroup (17a)
---------------

     Number of non-gridded receptors (NREC)  No default  !  NREC =  126  !
```

!END!

---
Subgroup (17b)
---

NON-GRIDDED (DISCRETE) RECEPTOR DATA[a]

| Receptor No. | | X UTM Coordinate (km) | Y UTM Coordinate (km) | Ground Elevation (m) | Height Above Ground (m) | [b] |
|---|---|---|---|---|---|---|
| 1 | ! X = | 557.0, | 2789.0, | 0.000, | 0.000! | !END! |
| 2 | ! X = | 556.6, | 2792.0, | 0.000, | 0.000! | !END! |
| 3 | ! X = | 556.0, | 2796.0, | 0.000, | 0.000! | !END! |
| 4 | ! X = | 553.0, | 2796.5, | 0.000, | 0.000! | !END! |
| 5 | ! X = | 548.0, | 2796.5, | 0.000, | 0.000! | !END! |
| 6 | ! X = | 542.7, | 2796.5, | 0.000, | 0.000! | !END! |
| 7 | ! X = | 542.7, | 2800.0, | 0.000, | 0.000! | !END! |
| 8 | ! X = | 542.7, | 2805.0, | 0.000, | 0.000! | !END! |
| 9 | ! X = | 542.7, | 2810.0, | 0.000, | 0.000! | !END! |
| 10 | ! X = | 542.0, | 2811.0, | 0.000, | 0.000! | !END! |
| 11 | ! X = | 541.3, | 2814.0, | 0.000, | 0.000! | !END! |
| 12 | ! X = | 542.7, | 2816.0, | 0.000, | 0.000! | !END! |
| 13 | ! X = | 544.1, | 2820.0, | 0.000, | 0.000! | !END! |
| 14 | ! X = | 543.5, | 2824.6, | 0.000, | 0.000! | !END! |
| 15 | ! X = | 545.0, | 2829.0, | 0.000, | 0.000! | !END! |
| 16 | ! X = | 545.7, | 2832.2, | 0.000, | 0.000! | !END! |
| 17 | ! X = | 546.2, | 2835.7, | 0.000, | 0.000! | !END! |
| 18 | ! X = | 548.6, | 2837.5, | 0.000, | 0.000! | !END! |
| 19 | ! X = | 550.3, | 2839.0, | 0.000, | 0.000! | !END! |
| 20 | ! X = | 545.0, | 2839.0, | 0.000, | 0.000! | !END! |
| 21 | ! X = | 540.0, | 2839.0, | 0.000, | 0.000! | !END! |
| 22 | ! X = | 550.5, | 2844.0, | 0.000, | 0.000! | !END! |
| 23 | ! X = | 545.0, | 2844.0, | 0.000, | 0.000! | !END! |
| 24 | ! X = | 540.0, | 2844.0, | 0.000, | 0.000! | !END! |
| 25 | ! X = | 550.3, | 2848.6, | 0.000, | 0.000! | !END! |
| 26 | ! X = | 549.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 27 | ! X = | 548.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 28 | ! X = | 547.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 29 | ! X = | 546.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 30 | ! X = | 545.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 31 | ! X = | 544.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 32 | ! X = | 543.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 33 | ! X = | 542.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 34 | ! X = | 541.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 35 | ! X = | 540.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 36 | ! X = | 539.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 37 | ! X = | 538.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 38 | ! X = | 537.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 39 | ! X = | 536.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 40 | ! X = | 535.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 41 | ! X = | 534.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 42 | ! X = | 533.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 43 | ! X = | 532.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 44 | ! X = | 531.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 45 | ! X = | 530.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 46 | ! X = | 529.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 47 | ! X = | 528.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 48 | ! X = | 527.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 49 | ! X = | 526.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 50 | ! X = | 525.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 51 | ! X = | 524.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 52 | ! X = | 523.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 53 | ! X = | 522.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 54 | ! X = | 521.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 55 | ! X = | 520.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 56 | ! X = | 519.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 57 | ! X = | 518.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 58 | ! X = | 517.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 59 | ! X = | 516.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 60 | ! X = | 515.0, | 2848.6, | 0.000, | 0.000! | !END! |
| 61 | ! X = | 514.5, | 2848.6, | 0.000, | 0.000! | !END! |

```
 62 ! X =      514.5,     2848.0,       0.000,       0.000!   !END!
 63 ! X =      514.5,     2847.6,       0.000,       0.000!   !END!
 64 ! X =      514.5,     2846.6,       0.000,       0.000!   !END!
 65 ! X =      514.5,     2845.0,       0.000,       0.000!   !END!
 66 ! X =      514.5,     2844.0,       0.000,       0.000!   !END!
 67 ! X =      514.5,     2843.0,       0.000,       0.000!   !END!
 68 ! X =      514.5,     2842.0,       0.000,       0.000!   !END!
 69 ! X =      514.5,     2841.0,       0.000,       0.000!   !END!
 70 ! X =      514.5,     2840.0,       0.000,       0.000!   !END!
 71 ! X =      514.5,     2839.0,       0.000,       0.000!   !END!
 72 ! X =      514.5,     2838.0,       0.000,       0.000!   !END!
 73 ! X =      514.5,     2837.0,       0.000,       0.000!   !END!
 74 ! X =      514.5,     2836.0,       0.000,       0.000!   !END!
 75 ! X =      514.5,     2835.0,       0.000,       0.000!   !END!
 76 ! X =      514.5,     2834.0,       0.000,       0.000!   !END!
 77 ! X =      514.5,     2833.0,       0.000,       0.000!   !END!
 78 ! X =      514.5,     2832.5,       0.000,       0.000!   !END!
 79 ! X =      510.0,     2832.5,       0.000,       0.000!   !END!
 80 ! X =      509.0,     2832.5,       0.000,       0.000!   !END!
 81 ! X =      508.0,     2832.5,       0.000,       0.000!   !END!
 82 ! X =      507.0,     2832.5,       0.000,       0.000!   !END!
 83 ! X =      506.0,     2832.5,       0.000,       0.000!   !END!
 84 ! X =      505.0,     2832.5,       0.000,       0.000!   !END!
 85 ! X =      504.0,     2832.5,       0.000,       0.000!   !END!
 86 ! X =      503.0,     2832.5,       0.000,       0.000!   !END!
 87 ! X =      502.0,     2832.5,       0.000,       0.000!   !END!
 88 ! X =      501.0,     2832.5,       0.000,       0.000!   !END!
 89 ! X =      500.0,     2832.5,       0.000,       0.000!   !END!
 90 ! X =      499.0,     2832.5,       0.000,       0.000!   !END!
 91 ! X =      498.0,     2832.5,       0.000,       0.000!   !END!
 92 ! X =      497.0,     2832.5,       0.000,       0.000!   !END!
 93 ! X =      496.0,     2832.5,       0.000,       0.000!   !END!
 94 ! X =      495.0,     2832.5,       0.000,       0.000!   !END!
 95 ! X =      495.0,     2833.0,       0.000,       0.000!   !END!
 96 ! X =      495.0,     2834.0,       0.000,       0.000!   !END!
 97 ! X =      495.0,     2835.0,       0.000,       0.000!   !END!
 98 ! X =      495.0,     2836.0,       0.000,       0.000!   !END!
 99 ! X =      494.5,     2837.0,       0.000,       0.000!   !END!
100 ! X =      491.5,     2841.0,       0.000,       0.000!   !END!
101 ! X =      488.5,     2845.5,       0.000,       0.000!   !END!
102 ! X =      483.0,     2848.5,       0.000,       0.000!   !END!
103 ! X =      480.0,     2852.5,       0.000,       0.000!   !END!
104 ! X =      475.0,     2854.0,       0.000,       0.000!   !END!
105 ! X =      473.5,     2857.0,       0.000,       0.000!   !END!
106 ! X =      473.0,     2860.0,       0.000,       0.000!   !END!
107 ! X =      472.0,     2860.0,       0.000,       0.000!   !END!
108 ! X =      471.0,     2860.0,       0.000,       0.000!   !END!
109 ! X =      470.0,     2860.0,       0.000,       0.000!   !END!
110 ! X =      469.0,     2860.0,       0.000,       0.000!   !END!
111 ! X =      468.0,     2860.0,       0.000,       0.000!   !END!
112 ! X =      467.0,     2860.0,       0.000,       0.000!   !END!
113 ! X =      466.0,     2860.0,       0.000,       0.000!   !END!
114 ! X =      465.0,     2860.0,       0.000,       0.000!   !END!
115 ! X =      464.0,     2860.0,       0.000,       0.000!   !END!
116 ! X =      463.0,     2860.0,       0.000,       0.000!   !END!
117 ! X =      462.0,     2860.0,       0.000,       0.000!   !END!
118 ! X =      461.0,     2860.0,       0.000,       0.000!   !END!
119 ! X =      460.0,     2860.0,       0.000,       0.000!   !END!
120 ! X =      459.5,     2863.2,       0.000,       0.000!   !END!
121 ! X =      459.0,     2863.2,       0.000,       0.000!   !END!
122 ! X =      458.0,     2863.2,       0.000,       0.000!   !END!
123 ! X =      457.0,     2863.2,       0.000,       0.000!   !END!
124 ! X =      456.0,     2863.2,       0.000,       0.000!   !END!
125 ! X =      455.0,     2863.2,       0.000,       0.000!   !END!
126 ! X =      454.0,     2863.2,       0.000,       0.000!   !END!
```

---

a
Data for each receptor are treated as a separate input subgroup and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered, the receptor is placed on the ground.