



# Department of Environmental Protection

Lawton Chiles  
Governor

Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Virginia B. Wetherell  
Secretary

October 9, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. R. Douglas Neeley, Chief  
Air, Radiation Technology Branch  
US EPA Region IV  
61 Forsyth Street  
Atlanta, GA 30303

Re: PSD Review and Custom Fuel Monitoring Schedule  
Santa Rosa Energy Center Cogeneration Project  
DEP File 1130168-001-AC

Dear Mr. Neeley:

Enclosed is a copy of the Department's Intent to Issue a permit to construct the Santa Rosa Energy Center. It will be a natural gas-fired cogeneration facility consisting of: a nominal 167 megawatt (MW) combustion turbine-electrical generator; a supplementary-fired heat recovery steam generator capable of raising sufficient steam to generate another 74 MW from a steam turbine-electrical generator and to meet the process steam requirements of the adjacent Sterling Fibers facility. Supplementary firing will be accomplished by a 585 million Btu per hour gas-fired duct burner.

The project is subject to the State's approved SIP for PSD review and is not subject to Florida's Power Plant Siting procedure because it will generate less than 75 MW of steam electricity.

Please send your written comments on or approval of the applicant's proposed custom fuel monitoring schedule. The plan is based on the enclosed letter dated January 16, 1996 from Region V to Dayton Power and Light. The Subpart GG limit on SO<sub>2</sub> emissions is 150 ppmvd @ 15% O<sub>2</sub> or a fuel sulfur limit of 0.8% sulfur. Neither of these limits could conceivably be violated by the use of pipeline quality natural gas which has a maximum SO<sub>2</sub> emission rate of 0.0006 lb/MMBtu (40 CFR 75 Appendix D Section 2.3.1.4). The sulfur content of pipeline quality natural gas in Florida has been estimated at a maximum of 0.003 % sulfur. No fuel oil will be used. The requirement has been incorporated into the enclosed draft permit as Specific Condition 45 and reads as follows:

Natural Gas Monitoring Schedule: A custom fuel monitoring schedule pursuant to 40 CFR 75 Appendix D for natural gas may be used in lieu of the daily sampling requirements of 40 CFR 60.334 (b)(2) provided the following requirements are met:

- The permittee shall apply for an Acid Rain permit within the deadlines specified in 40 CFR 72.30.

*"Protect, Conserve and Manage Florida's Environment and Natural Resources"*

*Printed on recycled paper.*

- The permittee shall submit a monitoring plan, certified by signature of the Designated Representative, that commits to using a primary fuel of pipeline supplied natural gas (sulfur content less than 20 gr/100 scf pursuant to 40 CFR 75.11(d)(2)).
- Each unit shall be monitored for SO<sub>2</sub> emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA.

This custom fuel monitoring schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to a higher sulfur fuel, SO<sub>2</sub> emissions must be accounted for as required pursuant to 40 CFR 75.11(d).

Please comment on Specific Condition 32 which allows the use of the acid rain NO<sub>x</sub> CEMS for demonstrating compliance as well as reporting excess emissions. The Subpart GG requirements for the water-to-fuel monitoring system do not apply because only combustion controls will be employed. Typically NO<sub>x</sub> emissions will be less than 10 ppmvd @15% O<sub>2</sub> which is less than one-tenth of the applicable Subpart GG limit based on the efficiency of the unit. A CEMS requirement is stricter and more accurate than any Subpart GG requirement for determining excess emissions.

The Department recommends your approval of the custom fuel monitoring schedule and these NO<sub>x</sub> monitoring provisions. We also request your comments on the Intent to Issue. If you have any questions on these matters please contact Teresa Heron at 850/921-9529.

Sincerely,

Handwritten signature of A. A. Linero in cursive, with the date "10/9" written to the right of the signature.

A. A. Linero, P.F., Administrator  
New Source Review Section

AAL/aal

Enclosures



# SANTA ROSA ENERGY LLC

650 Dundee Road, Suite 150  
Northbrook, Illinois 60062  
Telephone (847)559-9800  
Facsimile (847)559-1805

October 27, 1998  
Letter No. 14

## FEDERAL EXPRESS

Mr. A.A. Linero  
Administrator, New Source Review Section  
Division of Air Resources Management  
State of Florida Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road., MS# 5505  
Tallahassee, FL 32399-2400

Subject: DEP File No. 1130003-005AC (PSD-FL-253)  
Santa Rosa Energy Center

Dear Mr. Linero:

Santa Rosa Energy LLC is pleased to provide the enclosed newspaper affidavit as proof that the "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT" was published in the legal section of the *Santa Rosa Press Gazette* on October 26, 1998.

Should you have any questions or require further information, please contact me at (847)559-9800 extension 325.

Sincerely,

**SANTA ROSA ENERGY LLC**

Craig Carson

CRC:ag

Enclosure

cc: J. Shield  
J. Lay (Sterling Fibers)  
S. Alderman (Katz, Kutter)  
M. Carey (Weston)

File: SRO - ENV

cc: J. Neron, BAR  
NWD  
EPA  
NPS

# RECEIVED

OCT 29 1998

BUREAU OF  
AIR REGULATION

The Santa Rosa  
**PRESS GAZETTE**  
 PUBLISHED WEEKLY  
 Milton, Santa Rosa County, Florida  
 STATE OF FLORIDA

County of Santa Rosa  
 Before the undersigned authority personally appeared  
 Susan Holley

who on oath says that he is Cashier  
 of the Press Gazette, a weekly newspaper published at Milton  
 in Santa Rosa County, Florida; that the attached copy of  
 advertisement being a Public Notice  
 in the matter of Intent to Issue Air  
Construction Permit

in the \_\_\_\_\_ court,  
 was published in said newspaper in the issues of:  
October 26 A.D., 19 98  
 \_\_\_\_\_ A.D., 19 \_\_\_\_\_  
 \_\_\_\_\_ A.D., 19 \_\_\_\_\_  
 \_\_\_\_\_ A.D., 19 \_\_\_\_\_  
 \_\_\_\_\_ A.D., 19 \_\_\_\_\_

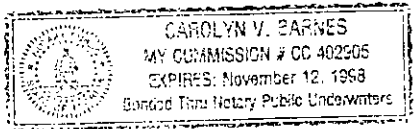
Affiant further says that the Press Gazette is a newspaper  
 published at Milton in said Santa Rosa County, Florida and that  
 said newspaper has heretofore been continuously published in  
 said Santa Rosa County, Florida, each week and has been  
 entered as second class mail matter at the post office in Milton  
 in Santa Rosa County, Florida, for a period of one year next  
 preceding the first publication of the attached copy of advertise-  
 ment; and affiant further says that he has neither paid nor  
 promised any person, firm or corporation any discount rebate,  
 commission or refund for the purpose of securing this advertise-  
 ment for publication in the said newspaper.

I (SWEAR) (AFFIRM) that the above information is true and  
 correct to the best of my knowledge.

Susan Holley  
 (Signature of Applicant)

Sworn to and subscribed before me this  
26 day of October 19 98  
Carolyn V. Barnes  
 (Signature of Notary Public-State of Florida)

(Print, Type or Stamp Commissioned Name of Notary Public)



Personally known  OR Produced Identification \_\_\_\_\_  
 Type of Identification Produced: \_\_\_\_\_

**PUBLIC NOTICE OF  
 INTENT TO ISSUE AIR  
 CONSTRUCTION PERMIT**

**STATE OF FLORIDA  
 DEPARTMENT OF  
 ENVIRONMENTAL  
 PROTECTION**

Santa Rosa Energy Center  
 Santa Rosa Energy LLC  
 Permit No. 1130168-001-  
 AC (PSD-FL-253)  
 Pace, Santa Rosa County,  
 Florida

The Department of  
 Environmental Protection  
 (Department) gives notice of  
 its intent to issue an air  
 construction permit under the  
 requirements for the  
 Prevention of Significant  
 Deterioration (PSD) of Air  
 Quality to Santa Rosa  
 Energy LLC (SREL). The  
 permit is to construct a  
 natural gas-fired  
 cogeneration facility  
 consisting of: a nominal 167  
 megawatt (MW) combustion  
 turbine-electrical generator;  
 a supplementary-fired heat  
 recovery steam generator  
 capable of raising sufficient  
 steam to generate another  
 74 MW from a steam  
 turbine-electrical generator  
 and to meet the process  
 steam requirements of the  
 adjacent Sterling Fibers  
 facility; a 200 foot main  
 stack; and ancillary  
 equipment. A Best Available  
 Control Technology (BACT)  
 determination was required  
 for particulate matter  
 (PM/PM10), nitrogen oxides  
 (NOx), volatile organic  
 compounds (VOC) and  
 carbon monoxide (CO)  
 pursuant to Rule 62-  
 212.400, F.A.C. and 40 CFR  
 52.21. The applicant's name  
 and address are Santa  
 Rosa Energy LLC, 650  
 Dundee Road, Northbrook,  
 Illinois 60062.

The cogeneration facility will  
 be located within the  
 boundaries of the existing  
 Sterling Fiber chemical plant  
 in Pace, Santa Rosa  
 County. Nitrogen oxides  
 emissions will be controlled  
 by Dry Low NOx(DLN) gas  
 turbine combustors and Low  
 NOx duct burners capable of  
 achieving overall emissions  
 of 9.8 parts per million by  
 volume at 15 percent  
 oxygen (ppmvd@15%O2)  
 with both the combustion  
 turbine and duct burner  
 operating simultaneously.  
 Lower emission limits will  
 apply if SREL choose  
 selective catalytic reduction

or selective non-catalytic  
 reduction in lieu of or in  
 conjunction with DLN  
 technology. SO2 and  
 PM/PM10 will be limited by  
 use of natural gas.  
 Emissions of VOC and CO  
 will be controlled by good  
 combustion practices.

The maximum potential  
 annual emissions in tons per  
 year based on the original  
 application are summarized  
 below. NOx emissions will be  
 lower as a result of the  
 Department's BACT  
 determination. Emission  
 increases will also be lower  
 because of decreased use  
 by Sterling Fibers of existing  
 and less efficient boilers.

Pollutants	Maximum Potential Emissions	PSD Significant Emission Rate
PM/PM10	55	25/15
SO2	7	40
NOx	402	40
VOC	45	40
CO	260	100

An air quality impact  
 analysis was conducted.  
 Maximum predicted impacts  
 due to proposed emissions  
 from the project are less than  
 the applicable PSD Class I  
 and Class II significant  
 impact levels. The effects of  
 the project are considered to  
 be minimal.

The department will accept  
 written comments and  
 requests for a public  
 meeting concerning the  
 proposed permit issuance  
 action for a period of 30 (thirty)  
 days from the date of  
 publication of "Public Notice  
 of Intent to Issue Air  
 Construction Permit."  
 Written comments should be  
 provided to the  
 Department's Bureau of Air  
 Regulation at 2600 Blair  
 Stone Road, Mail Station  
 #5505, Tallahassee, FL  
 32399-2400. Any written  
 comments filed shall be  
 made available for public  
 inspection. If written  
 comments received result in  
 a significant change in the  
 proposed agency action,

the Department shall revise the proposed permit and require, if applicable, another Public Notice.

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S. before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course

of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of  
Environmental Protection  
Bureau of Air Regulation  
111 South Magnolia Drive,  
Suite 4  
Tallahassee, Florida 32301  
Telephone: 850/488-0114  
Fax: 850/922-6979

Department Environmental  
Protection  
Northwest District Office  
160 Governmental Center  
Pensacola, Florida 32501-  
5794  
Telephone: 850/595-8300  
Fax: 850/595-4417

The complete project file includes the Draft Permit, the application, and the information submitted by

the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

102698  
102698  
1021980001

Z 333 612 525

US Postal Service  
**Receipt for Certified Mail**

No Insurance Coverage Provided.  
Do not use for International Mail (See reverse)

PS Form 3800, April 1995

Serial to		James Shield
Street & Number		Santa Rosa Energy
Post Office, State, & ZIP Code		Northbrook IL
Postage	\$	
Certified Fee		
Special Delivery Fee		
Restricted Delivery Fee		
Return Receipt Showing to Whom & Date Delivered		
Return Receipt Showing to Whom, Date, & Addressee's Address		
TOTAL Postage & Fees	\$	
Postmark or Date		10-9-98
113D148-001-AC		
PSO-FI-253		

Is your RETURN ADDRESS completed on the reverse side?

**SENDER:**

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):

- Addressee's Address
- Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:  
Mr. James Shield, VP  
Santa Rosa Energy  
650 Dundee Rd. Suite 150  
Northbrook, IL 60062

4a. Article Number  
Z 333 612 525

4b. Service Type

<input type="checkbox"/> Registered	<input checked="" type="checkbox"/> Certified
<input type="checkbox"/> Express Mail	<input type="checkbox"/> Insured
<input type="checkbox"/> Return Receipt for Merchandise	<input type="checkbox"/> COD

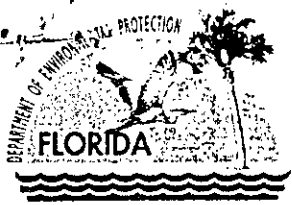
7. Date of Delivery  
10/05/98

5. Received By: (Print Name)

8. Addressee's Address (Only if requested and fee is paid)

6. Signature: (Addressee or Agent)  
X G Goodman

Thank you for using Return Receipt Service.



# Department of Environmental Protection

Lawton Chiles  
Governor

Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Virginia B. Wetherell  
Secretary

October 9, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. James Shield  
Vice-President  
Santa Rosa Energy LLC  
650 Dundee Road, Suite 150  
Northbrook, Illinois 60062

Re: DEP File No. 1130168-001-AC (PSD-FL-253)  
Santa Rosa Energy Center - Cogeneration Plant

Dear Mr. Shields:

Enclosed is one copy of the Draft Air Construction Permit, Technical Evaluation and Preliminary Determination, and Draft BACT Determination, for the referenced project at the Santa Rosa Energy LLC, 5005 Sterling Way, Pace, Santa Rosa County. The Department's Intent to Issue Air Construction Permit and the "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT" are also included.

The "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT" must be published in the legal section of a newspaper of general circulation in Santa Rosa County. Proof of publication, i.e., newspaper affidavit, must be provided to the Department's Bureau of Air Regulation office within 7 (seven) days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A. A. Linero, P.E., Administrator, New Source Review Section at the above letterhead address. If you have any other questions, please call Ms. Teresa Heron at 850/921-9529 or Mr. Linero at (850)921-9523.

Sincerely,

C. H. Fancy, P.E., Chief,  
Bureau of Air Regulation

CHF/aal

Enclosures

In the Matter of an  
Application for Permit by:

Mr. James Shield, Vice-President  
Santa Rosa Energy LLC  
650 Dundee Road, Suite 150  
Northbrook, Illinois 60062

DEP File No. 1130168-001-AC  
DRAFT Permit No. PSD-FL-253  
241 MW Cogeneration Plant  
Santa Rosa County

### INTENT TO ISSUE AIR CONSTRUCTION PERMIT

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit (copy of DRAFT Permit attached) for the proposed project, detailed in the application specified above and the attached Technical Evaluation and Preliminary Determination, for the reasons stated below.

The applicant, Santa Rosa Energy LLC, applied on July 8, 1998 to the Department for an air construction permit to construct a natural gas-fired cogeneration facility consisting of: a nominal 167 megawatt (MW) combustion turbine-electrical generator; a supplementary-fired heat recovery steam generator capable of raising sufficient steam to generate another 74 MW from a steam turbine-electrical generator and to meet the process steam requirements of the adjacent Sterling Fibers facility; a 200 foot main stack; and ancillary equipment. The plant will be located within the boundaries of the Sterling Fiber, Inc. chemical plant in Pace, Santa Rosa, County.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-212. The above actions are not exempt from permitting procedures. The Department has determined that an air construction permit, including a review for the Prevention of Significant Deterioration and a determination of Best Available Control Technology for the control of nitrogen oxides, carbon monoxide, particulate matter, and volatile organic compounds, is required to conduct the work.

The Department intends to issue this air construction permit based on the belief that reasonable assurances have been provided to indicate that operation of these emission units will not adversely impact air quality, and the emission units will comply with all appropriate provisions of Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297, F.A.C.

Pursuant to Section 403.815, F.S., and Rule 62-110.106(7)(a)1., F.A.C., you (the applicant) are required to publish at your own expense the enclosed "Public Notice of Intent to Issue Air Construction Permit." The notice shall be published one time only in the legal advertisement section of a newspaper of general circulation in the area affected. For the purpose of these rules, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. Where there is more than one newspaper of general circulation in the county, the newspaper used must be one with significant circulation in the area that may be affected by the permit. If you are uncertain that a newspaper meets these requirements, please contact the Department at the address or telephone number listed below. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32399-2400 (Telephone: 850/488-0114; Fax 850/ 922-6979). The Department suggests that you publish the notice within thirty days of receipt of this letter. You must provide proof of publication within seven days of publication, pursuant to Rule 62-110.106(5), F.A.C. No permitting action for which published notice is required shall be granted until proof of publication of notice is made by furnishing a uniform affidavit in substantially the form prescribed in section 50.051, F.S. to the office of the Department issuing the permit or other authorization. Failure to publish the notice and provide proof of publication may result in the denial of the permit pursuant to Rules 62-110.106(9) & (11), F.A.C.

The Department will issue the final permit with the attached conditions unless a response received in accordance with the following procedures results in a different decision or significant change of terms or conditions.

The Department will accept written comments concerning the proposed permit issuance action for a period of thirty (30) days from the date of publication of "Public Notice of Intent to Issue Air Construction Permit." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.



The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station # 35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by rule 28-106.301

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.


In addition to the above, a person subject to regulation has a right to apply for a variance from or waiver of the requirements of particular rules, on certain conditions, under Section 120.542, F.S. The relief provided by this state statute applies only to state rules, not statutes, and not to any federal regulatory requirements. Applying for a variance or waiver does not substitute or extend the time for filing a petition for an administrative hearing or exercising any other right that a person may have in relation to the action proposed in this notice of intent.

The application for a variance or waiver is made by filing a petition with the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000. The petition must specify the following information: (a) The name, address, and telephone number of the petitioner; (b) The name, address, and telephone number of the attorney or qualified representative of the petitioner, if any; (c) Each rule or portion of a rule from which a variance or waiver is requested; (d) The citation to the statute underlying (implemented by) the rule identified in (c) above; (e) The type of action requested; (f) The specific facts that would justify a variance or waiver for the petitioner; (g) The reason why the variance or waiver would serve the purposes of the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

The Department will grant a variance or waiver when the petition demonstrates both that the application of the rule would create a substantial hardship or violate principles of fairness, as each of those terms is defined in Section 120.542(2) F.S., and that the purpose of the underlying statute will be or has been achieved by other means by the petitioner.

Persons subject to regulation pursuant to any federally delegated or approved air program should be aware that Florida is specifically not authorized to issue variances or waivers from any requirements of any such federally delegated or approved program. The requirements of the program remain fully enforceable by the Administrator of the EPA and by any person under the Clean Air Act unless and until the Administrator separately approves any variance or waiver in accordance with the procedures of the federal program.

Executed in Tallahassee, Florida.

  
for C. H. Fancy, P.E., Chief  
Bureau of Air Regulation


**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE AIR CONSTRUCTION PERMIT (including the PUBLIC NOTICE, Technical Evaluation and Preliminary Determination, Draft BACT Determination, and the DRAFT permit) was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on 10-9-98 to the person(s) listed:

- Mr. James Shield, SRELLC \*
- Mr. Craig Carson, SRELLC
- Mr. Mark Cramer, P.E., R. F. Weston
- Mr. Ed Middleswart, DEP-NWD
- Mr. Doug Neely, EPA
- Mr. John Bunyak, NPS

Clerk Stamp

**FILING AND ACKNOWLEDGMENT FILED**, on this date, pursuant to §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

  
(Clerk) 10-9-98  
(Date)

**NOTICE TO BE PUBLISHED  
IN THE NEWSPAPER**

**PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT**

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Santa Rosa Energy Center  
Santa Rosa Energy LLC

Permit No. 1130168-001-AC (PSD-FL-253)  
Pace, Santa Rosa County, Florida

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit under the requirements for the Prevention of Significant Deterioration (PSD) of Air Quality to Santa Rosa Energy LLC (SREL). The permit is to construct a natural gas-fired cogeneration facility consisting of: a nominal 167 megawatt (MW) combustion turbine-electrical generator; a supplementary-fired heat recovery steam generator capable of raising sufficient steam to generate another 74 MW from a steam turbine-electrical generator and to meet the process steam requirements of the adjacent Sterling Fibers facility; a 200 foot main stack; and ancillary equipment. A Best Available Control Technology (BACT) determination was required for particulate matter (PM/PM<sub>10</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOC) and carbon monoxide (CO) pursuant to Rule 62-212.400, F.A.C. and 40 CFR 52.21. The applicant's name and address are Santa Rosa Energy LLC, 650 Dundee Road, Northbrook, Illinois 60062.

The cogeneration facility will be located within the boundaries of the existing Sterling Fiber chemical plant in Pace, Santa Rosa County. Nitrogen oxides emissions will be controlled by Dry Low NO<sub>x</sub> (DLN) gas turbine combustors and Low NO<sub>x</sub> duct burners capable of achieving overall emissions of 9.8 parts per million by volume at 15 percent oxygen (ppmvd@15% O<sub>2</sub>) with both the combustion turbine and duct burner operating simultaneously. Lower emission limits will apply if SREL chooses selective catalytic reduction or selective non-catalytic reduction in lieu of or in conjunction with DLN technology. SO<sub>2</sub> and PM/PM<sub>10</sub> will be limited by use of natural gas. Emissions of VOC and CO will be controlled by good combustion practices.

The maximum potential annual emissions in tons per year based on the original application are summarized below. NO<sub>x</sub> emissions will be lower as a result of the Department's BACT determination. Emissions increases will also be lower because of decreased use by Sterling Fibers of existing and less efficient boilers.

<u>Pollutants</u>	<u>Maximum Potential Emissions</u>	<u>PSD Significant Emission Rate</u>
PM/PM <sub>10</sub>	55	25/15
SO <sub>2</sub>	7	40
NO <sub>x</sub>	402	40
VOC	45	40
CO	260	100

An air quality impact analysis was conducted. Maximum predicted impacts due to proposed emissions from the project are less than the applicable PSD Class I and Class II significant impact levels. The effects of the project are considered to be minimal.

The Department will accept written comments and requests for a public meeting concerning the proposed permit issuance action for a period of 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue Air Construction Permit." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

## NOTICE TO BE PUBLISHED IN THE NEWSPAPER

The Department will issue the permit with the attached conditions unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57 F.S., before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below. Mediation is not available in this proceeding.

A person whose substantial interests are affected by the proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station # 35, Tallahassee, Florida, 32399-3000. Petitions filed by the permit applicant or any of the parties listed below must be filed within fourteen days of receipt of this notice of intent. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3) of the Florida Statutes must be filed within fourteen days of publication of the public notice or within fourteen days of receipt of this notice of intent, whichever occurs first. Under Section 120.60(3), however, any person who asked the Department for notice of agency action may file a petition within fourteen days of receipt of that notice, regardless of the date of publication. A petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition within the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 F.S., or to intervene in this proceeding and participate as a party to it. Any subsequent intervention will be only at the approval of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205 of the Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information: (a) The name and address of each agency affected and each agency's file or identification number, if known; (b) The name, address, and telephone number of the petitioner, the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination; (c) A statement of how and when petitioner received notice of the agency action or proposed action; (d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate; (e) A concise statement of the ultimate facts alleged, as well as the rules and statutes which entitle the petitioner to relief; and (f) A demand for relief.

A petition that does not dispute the material facts upon which the Department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department on the application have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

A complete project file is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection  
Bureau of Air Regulation  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Telephone: 850/488-0114  
Fax: 850/922-6979

Department Environmental Protection  
Northwest District Office  
160 Governmental Center  
Pensacola, Florida 32501-5794  
Telephone: 850/595-8300  
Fax: 850/595-4417

The complete project file includes the Draft Permit, the application, and the information submitted by the responsible official, exclusive of confidential records under Section 403.111, F.S. Interested persons may contact the New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 850/488-0114, for additional information.

TECHNICAL EVALUATION  
AND  
PRELIMINARY DETERMINATION

Santa Rosa Energy LLC

Santa Rosa Energy Center  
241 Megawatt Cogeneration Plant  
Pace, Santa Rosa County

DEP File No. 1130168-001-AC  
PSD-FL-253

Department of Environmental Protection  
Division of Air Resources Management  
Bureau of Air Regulation

October 9, 1998

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## 1. APPLICATION INFORMATION

### 1.1 Applicant Name and Address

Santa Rosa Energy LLC (SREL)  
5005 Sterling Way  
Pace, Florida 32571

Authorized Representative: James Shield, Vice-President

### 1.2 Reviewing and Process Schedule

07-08 98: Date of Receipt of Application  
08-03-98: DEP Incompleteness Letter  
09-08-98: Received Santa Rosa Response to Incompleteness Letter  
10-09-98: Intent Issued

## 2. FACILITY INFORMATION

### 2.1 Facility Location

The Santa Rosa Energy Center (SREC) will be located within the boundaries of the Sterling Fibers' chemical complex in Pace, Santa Rosa, County. This site is approximately 200 kilometers from the Bradwell Bay National Wilderness Area, 210 kilometers from the St. Marks National Wilderness Area and 175 kilometers from the Breton National Wilderness Area in Louisiana, all Class I PSD Areas. The UTM coordinates of this facility are Zone 16; 488,970 km E; 3,381.350 km N.

### 2.2 Standard Industrial Classification Codes (SIC)

Industry Group No.	49	Electric, Gas, and Sanitary Services
Industry No.	4911	Electric Services

### 2.3 Facility Category

The SREC is a new major facility. The new cogeneration facility identification number in the Department database (ARMS system) is F.I.D. No. 1130168. This facility will be located within the Sterling Fibers' chemical plant boundary but it is not part of the Sterling Fibers chemical plant operation or corporate ownership. However, SREL will provide steam and electricity to Sterling Fibers and electricity to the electric utility grid.

The new facility will be classified as a Major or Title V Source of air pollution because emissions of nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO) exceed 100 TPY. The new facility is within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions will be greater than 100 TPY for CO and NO<sub>x</sub>, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) is required for these two pollutants.

Given that the project constitutes a Major Facility for CO or NO<sub>x</sub>, emissions greater than 40 TPY of sulfur dioxide (SO<sub>2</sub>) or volatile organic compounds (VOC), 25/15 TPY of particulate matter (PM/PM<sub>10</sub>), etc., also require review per the PSD rules and a BACT determination.

This facility is subject to the Acid Rain Program, 40 CFR 72, because it is a combined cycle cogeneration facility constructed after 15 November 1990 and more than one-third of its potential electrical output capacity (greater than 219,000 MW-hrs of electricity) will be sold to a utility.

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## 3. PROJECT DESCRIPTION

This permit addresses the following emissions units:

EMISSION UNIT NO.	SYSTEM	EMISSION UNIT DESCRIPTION
001	Power Generation	One 167 Megawatt (nominal) Gas Combustion Turbine-Electrical generator
002	Steam Generation	One 585 mmBtu/hr Supplementary-Fired Heat Recovery Steam Generator (HRSG) (and 74 Megawatt Steam Electrical Turbine)
003	Water Cooling	Cooling Tower

Santa Rosa Energy Center LLC (SREL) proposes to construct a nominal 241 megawatt (MW) natural gas-fired cogeneration facility. This cogeneration facility will consist of: a nominal 167 MW gas combustion turbine-electrical generator; a 585 million Btu per hour (mmBtu/hr) supplementary-fired heat recovery steam generator (HRSG); a 74 MW (gross output) steam turbine; a 200-foot stack; and ancillary equipment. This facility will be located within the boundaries of the existing Sterling Fiber chemical plant at 5005 Sterling Way in Pace, Santa Rosa County.

The turbine will be equipped with Dry Low NO<sub>x</sub> (DLN-2.6) combustors for the control of NO<sub>x</sub> emissions to 9 ppmvd at 15% O<sub>2</sub> from 50% load up to 100% load conditions during normal operations. The turbine will have a nominal heat input of 1,600 mmBtu/hr lower heat value (LHV) at ambient conditions and 60% relative humidity while operating at 100% load.

The (HRSG) will have a design fuel input capacity of 585 mmBtu/hr higher heat value (HHV) from the duct burner and approximately 971 mmBtu/hr from the combustion turbine exhaust. The duct burner will be of a "Low NO<sub>x</sub>" design in order to control emissions of nitrogen oxides.

Without supplemental firing and at full load, enough steam can be raised to generate 74 MW from the steam turbine and provide some process steam to Sterling Fibers. Supplemental firing will increase steam production for electrical and process use by at least 60 percent at baseload. The firing capability allows for flexibility in meeting the steam demand from Sterling Fibers, within the capabilities and constraints of the burner system, the combustion turbine, and electrical demands.

When the cogeneration facility operates, the Sterling Fiber boilers will normally be off-line. This will result in a temporary significant reduction in NO<sub>x</sub> emissions.

Emission increases will occur for carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), particulate matter (PM/PM<sub>10</sub>), volatile organic compounds (VOC) and nitrogen oxides (NO<sub>x</sub>). Emission increases of SO<sub>2</sub>, and H<sub>2</sub>SO<sub>4</sub> will be less than their respective significant emission levels per Table 62-212.400-2, F.A.C. and do not require PSD or non-attainment new source review. PSD review is required for CO, PM/PM<sub>10</sub>, NO<sub>x</sub>, and VOC since emissions, per the application, will increase by more than their respective significant emissions levels.

## TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

### 4. PROCESS DESCRIPTION

Much of the following discussion is from a 1993 EPA document on Alternative Control Techniques for NO<sub>x</sub> Emissions from Stationary Gas turbines. Project specific information is interspersed where appropriate.

A gas turbine is an internal combustion engine that operates with rotary rather than reciprocating motion. Ambient air is drawn into the 18-stage compressor of the GE 7FA where it is compressed by a pressure ratio of about 15 times atmospheric pressure. The compressed air is then directed to the combustor section, where fuel is introduced, ignited, and burned. The combustion section consists of 14 separate can-annular combustors.

An exterior view of the GE MS 7001FA (a predecessor of the MS 7241FA) is shown in Figure 1. The key components are identified in Figure 2. The unit will be delivered with 14 can-annular design, DLN-2.6 combustors instead of those shown in Figure 2.

Flame temperatures in a typical combustor section can reach 3600 degrees Fahrenheit (°F). Units such as the 7FA operate at lower flame temperatures which minimize NO<sub>x</sub> formation. The hot combustion gases are then diluted with additional cool air and directed to the turbine section at temperatures of approximately 2400 °F. Energy is recovered in the turbine section in the form of shaft horsepower, of which typically more than 50 percent is required to drive the internal compressor section. The balance of recovered shaft energy is available to drive the external load unit such as an electrical generator.

Figure 3 is a simplified process flow diagram showing the key plant components. In the SREL project, the unit will always operate in the combined cycle mode, meaning that the hot combustion turbine gases are further utilized rather than exhausted through a bypass stack. In this mode, the gas turbine directly drives an electric generator while the exhausted gases (containing a high excess air fraction) are used to raise steam in a HRSG. Because the HRSG will be equipped with a duct burner, the hot combustion turbine exhaust gases can be used as combustion air to raise additional steam by supporting the combustion of additional gas. Figure 4 is a diagram of an in-line duct burner manufactured by Coen.

In simple cycle mode, the thermal efficiency of the GE 7FA line of combustion turbines is about 35 percent. In combined cycle mode, with all steam used to generate electrical power, efficiencies of 56 percent are possible. Production of steam in the HRSG for electrical and process use (cogeneration), can result in efficiencies between 56 and 85 percent. The maximum value represents production of steam solely for process use. It is noted that the thermal efficiency of steam raised by the duct burners and used for process requirements is nearly 100 percent.

The project includes highly automated controls, described as the GE Mark V Control System. The SPEEDTRONIC Mark V Gas Turbine Control System is designed to fulfill all of the gas turbine control requirements.

Additional process information related to the combustor design, and control measures to minimize NO<sub>x</sub> formation are given in the draft BACT determination distributed with this evaluation.



# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## 5. RULE APPLICABILITY

The proposed project is subject to preconstruction review requirements under the provisions of Chapter 403, Florida Statutes, and Chapters 62-4, 62-204, 62-210, 62-212, 62-214, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.).

This facility is located in Escambia County, an area designated as unclassifiable for SO<sub>2</sub> and attainment for all other criteria pollutants in accordance with Rule 62-204.360, F.A.C. The proposed project is subject to review under Rule 62-212.400., F.A.C., Prevention of Significant Deterioration (PSD), because the potential emission increases for PM/PM<sub>10</sub>, CO, VOC and NO<sub>x</sub> exceed the significant emission rates given in Chapter 62-212, Table 62-212.400-2, F.A.C.

This PSD review consists of a determination of Best Available Control Technology (BACT) for PM/PM<sub>10</sub>, VOC, CO, and NO<sub>x</sub>. An analysis of the air quality impact from proposed project upon soils, vegetation and visibility is required along with air quality impacts resulting from associated commercial, residential, and industrial growth.

The emission units affected by this PSD permit shall comply with all applicable provisions of the Florida Administrative Code (including applicable portions of the Code of Federal Regulations incorporated therein) and, specifically, the following Chapters and Rules:

### 5.1 State Regulations

Chapter 62-4	Permits.
Rule 62-204.220	Ambient Air Quality Protection
Rule 62-204.240	Ambient Air Quality Standards
Rule 62-204.260	Prevention of Significant Deterioration Increments
Rule 62-204.800	Federal Regulations Adopted by Reference
Rule 62-210.300	Permits Required
Rule 62-210.350	Public Notice and Comments
Rule 62-210.370	Reports
Rule 62-210.550	Stack Height Policy
Rule 62-210.650	Circumvention
Rule 62-210.700	Excess Emissions
Rule 62-210.900	Forms and Instructions
Rule 62-212.300	General Preconstruction Review Requirements
Rule 62-212.400	Prevention of Significant Deterioration
Rule 62-213	Operation Permits for Major Sources of Air Pollution
Rule 62-214	Requirements For Sources Subject To The Federal Acid Rain Program
Rule 62-296.320	General Pollutant Emission Limiting Standards
Rule 62-297.310	General Test Requirements
Rule 62-297.401	Compliance Test Methods
Rule 62-297.520	EPA Continuous Monitor Performance Specifications

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## 5.2 Federal Rules

40 CFR 52.21	Prevention of Significant Deterioration (PSD)
40 CFR 60	NSPS Subparts GG and Da
40 CFR 60	Applicable sections of Subpart A, General Requirements
40 CFR 72	Acid Rain Permits (applicable sections)
40 CFR 73	Allowances (applicable sections)
40 CFR 75	Monitoring (applicable sections including applicable appendices)
40 CFR 77	Acid Rain Program-Excess Emissions (future applicable requirements)

## 6. SOURCE IMPACT ANALYSIS

### 6.1 Emission Limitations

The proposed Units will emit the following PSD pollutants (Table 212.400-2): particulate matter, sulfur dioxide, nitrogen oxides, volatile organic compounds, carbon monoxide, and negligible quantities of sulfuric acid mist, fluorides, beryllium, mercury and lead. The applicant's proposed annual emissions are summarized in the Table below and form the basis of the source impact review. The Department's proposed permitted allowable emissions for these Units are summarized in the Draft BACT document and Specific Conditions Nos. 20 through 26 of Draft Permit PSD-FL-253.

### 6.2 Emission Summary

The emissions for all PSD pollutants as a result of the construction of this facility are presented below:

### FACILITY EMISSIONS (TPY) AND PSD APPLICABILITY

Pollutants	Combustion Turbine <sup>1</sup>	Duct Burner	Total	PSD Significance	PSD REVIEW?
PM/PM <sub>10</sub>	41.6	13.1	55	25	Yes
SO <sub>2</sub>	4.8	1.6	7	40	No
NO <sub>x</sub>	271	131	402	40	Yes
CO	129	131	260	100	Yes
Ozone(VOC)	13	31	44	40	Yes
Sulfuric Acid Mist	<1	<1	<2	7	No
Total Reduced Sulfur	<1	<1	<2	10	No
Mercury	<<0.1	0.0004	<<0.1	0.1	No
Beryllium	<<0.0004	0.00002	<0.0004	0.0004	No
Lead	<<0.6	0.0008	<<0.6	0.6	No
Total HAPs	<10	3.1	<15	NA	No

1. Gas turbine emissions at 68 °F and 8,760 hours of operation. Duct Burner emissions at 64 percent availability. Mercury, beryllium, lead emissions are for duct burner only. With gas turbine they would still be insignificant for PSD review.

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

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## 6.3 Control Technology

Emissions control will be primarily accomplished by good combustion of clean natural gas. The gas turbine combustors will operate in lean pre-mixed mode to minimize the flame temperature and nitrogen oxides formation potential. The DLN-2.6 combustors will control combustion turbine emissions of CO and NO<sub>x</sub> to 9 ppm @15% O<sub>2</sub> between 50 and 100% of full load under normal operating conditions. Low NO<sub>x</sub> burners will be utilized in the HRSG to achieve NO<sub>x</sub> values of 0.05 lb/mmBtu heat input. Alternatives including selective catalytic reduction (SCR) and selective non-catalytic reduction (SNCR) are available if these rates cannot be achieved by Low NO<sub>x</sub> technologies. A full discussion is given in the Draft Best Available Control Technology (BACT) Determination (see Permit Appendix BD). The Draft BACT is incorporated into this evaluation by reference.

## 6.4 Air Quality Analysis

### 6.4.1 Introduction

The proposed project will increase emissions of four pollutants at levels in excess of PSD significant amounts: PM<sub>10</sub>, CO, NO<sub>x</sub>, and VOC. PM<sub>10</sub> and NO<sub>x</sub> are criteria pollutants and have national and state ambient air quality standards (AAQS), PSD increments, and significant impact levels defined for them. CO and VOC are criteria pollutants and have only AAQS and significant impact levels defined for them. Since the project's VOC emissions increase is less than 100 tons per year no air quality analysis is required for VOC.

The applicant's initial PM<sub>10</sub>, CO and NO<sub>x</sub> air quality impact analyses for this project predicted no significant impacts; therefore, further applicable AAQS and PSD increment impact analyses for these pollutants were not required. The nearest PSD Class I areas are the Breton National Wilderness Area located 175 km to the southwest in Louisiana and the Bradwell Bay National Wilderness area located 200 km to the east. Based on the preceding discussion the air quality analyses required by the PSD regulations for this project are the following:

- A significant impact analysis for PM<sub>10</sub>, CO and NO<sub>x</sub>;
- An analysis of impacts on soils, vegetation, and visibility and of growth-related air quality modeling impacts.

Based on these required analyses, the Department has reasonable assurance that the proposed project, as described in this report and subject to the conditions of approval proposed herein, will not cause or significantly contribute to a violation of any AAQS or PSD increment. However, the following EPA-directed stack height language is included: "In approving this permit, the Department has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A more detailed discussion of the required analyses follows.

## TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

### 6.4.2 Models and Meteorological Data Used in the Significant Impact Analysis

The EPA-approved SCREEN3 (screening model) and Industrial Source Complex Short-Term (ISCST3) dispersion models were used to evaluate the pollutant emissions from the proposed project. These models determine ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. They incorporate elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition. The ISCST3 model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. The applicant used the EPA recommended regulatory options. Direction-specific downwash parameters were used for all sources for which downwash was considered. The stacks associated with this project all satisfy the good engineering practice (GEP) stack height criteria.

Meteorological data used in the ISCST3 model consisted of a concurrent 5-year period of hourly surface weather observations and twice-daily upper air soundings from the National Weather Service (NWS) stations at Pensacola Airport, Florida (surface data) and Apalachicola, Florida (upper air data). The 5-year period of meteorological data was from 1985 through 1989. These NWS stations were selected for use in the study because they are the closest primary weather stations to the study area and are most representative of the project site. The surface observations included wind direction, wind speed, temperature, cloud cover, and cloud ceiling.

For determining the project's significant impact area in the vicinity of the facility and in the PSD Class I area, the highest predicted short-term concentrations and highest predicted annual averages were compared to their respective significant impact levels.

### 6.4.3 Significant Impact Analysis

Initially, the applicant conducts modeling using only the proposed project's emissions at worst load conditions. In order to determine worst-case load conditions the SCREEN3 model was used to evaluate dispersion of emissions from the cogeneration unit for four loads (50%, 65%, 75% and 100%) and three seasonal operating conditions (summer, winter, and average). If this modeling at worst-case load conditions shows significant impacts, additional multi-source modeling is required to determine the project's impacts on the existing air quality and any applicable AAQS and PSD increments. Receptors were placed within 10 km of the facility, which is located in a PSD Class II area. They were also placed in the Breton National Wilderness Area (BNWA), which is the closest PSD Class I area. Breton is located approximately 175 km to the southwest of the project. The receptor grid for predicting maximum concentrations in the vicinity of the project was a rectangular receptor grid with 20 km by 20 km dimensions centered on the cogeneration facility stack. The inner portion of the grid had grid cells at 100 m spacing out to 1,000m. A 200 m spacing was used out to 3,000 m; and a 500 m spacing was used out to 5,000m. From 5,000 m to 10,000 m, a 1,000 m spacing was used. For predicting impacts at the BNWA, six discrete receptors along the border of the PSD Class I area were used. For each pollutant subject to PSD and also subject to PSD increment and/or AAQS analyses, this modeling compares maximum predicted impacts due to the project with PSD significant impact levels to determine whether significant

## TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

impacts due to the project are predicted in the vicinity of the facility or in the BNWA. The tables below show the results of this modeling.

### Maximum Project Air Quality Impacts for Comparison to the PSD Class II Significant Impact Levels in the Vicinity of the Facility

Pollutant	Averaging Time	Max Predicted Impact (ug/m3)	Significant Impact Level (ug/m3)	Significant Impact?
PM <sub>10</sub>	Annual	0.02	1	NO
	24-hour	0.55	5	NO
CO	8-hour	6	500	NO
	1-hour	31	2000	NO
NO <sub>2</sub>	Annual	0.1	1	NO

### Maximum Project Air Quality Impacts for Comparison to the PSD Class I Significant Impact Levels (BNWA)

Pollutant	Averaging Time	Max. Predicted Impact at Class I Area (ug/m3)	Proposed EPA Significant Impact Level (ug/m3)	Significant Impact?
PM <sub>10</sub>	Annual	0.001	0.2	NO
	24-hour	0.01	0.3	NO
NO <sub>2</sub>	Annual	0.004	0.1	NO

The results of the significant impact modeling show that there are no significant impacts predicted from emissions from this project; therefore, no further modeling was required.

#### 6.4.4 Impacts Analysis

##### *Impact Analysis Impacts On Soils, Vegetation, Wildlife, and Visibility*

The maximum ground-level concentration increases predicted to occur for PM<sub>10</sub>, CO, NO<sub>x</sub>, and VOC as a result of the proposed project are less than significant. As such, this project is not expected to have a harmful impact on soils, vegetation, wildlife, and visibility in both the PSD Class I and II areas. Even the minimal impacts will be ameliorated by decreased use of the less efficient and more polluting boilers normally providing process steam to Stirling Fibers.

## TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

### *Growth-Related Air Quality Impacts*

The proposed project is a private sector investment. It will help meet current and future state-wide electric demands and the process steam requirements of Stirling Fibers, the steam host for the cogeneration project. Additional growth in the immediate area as a direct result of the additional electric power provided by the project is not expected. The project itself will be constructed and operated with minimum labor and associated facilities and is not expected to permanently affect growth in the local area. Obviously any increase in highly efficient electric power capacity promotes or accommodates further state-wide growth.

### *Air Toxics*

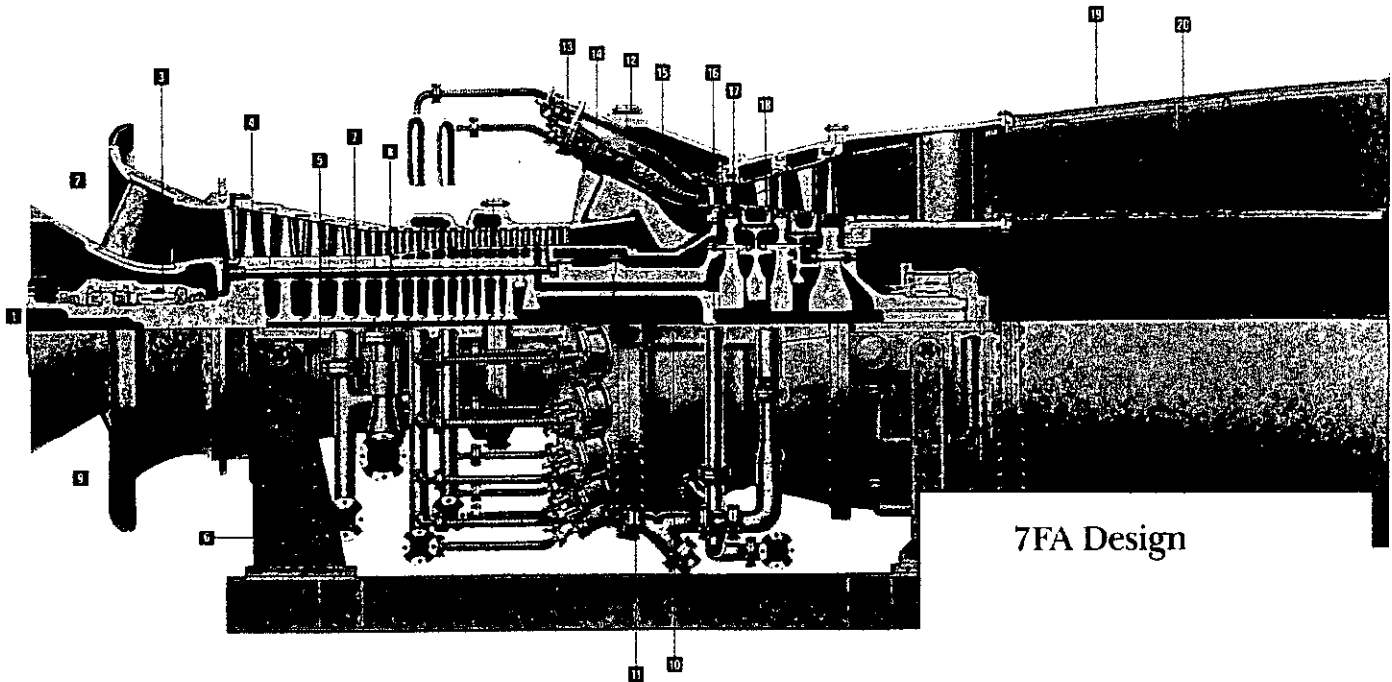
Both releases and ground level concentrations of hazardous air pollutants (HAPS) are below any applicable NSPS, NESHAP, and PSD threshold. The available air pollution control equipment for this project will have little impact on regulated HAPS.

## 7. CONCLUSION

Based on the foregoing technical evaluation of the application and additional information submitted by the applicant, the Department has made a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations, provided the Department's BACT determination is implemented.

*Teresa Heron, Review Engineer*  
*Cleve Holladay, Meteorologist*

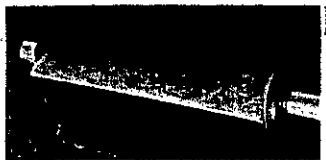
*Reviewed and Approved by A. A. Linero, P.E.*



## 7FA Design

### COMPRESSOR

- 1. Load Coupling** - short, rigid coupling can be directly connected to generator flange
- 2. Axial/Radial Inlet Casing** - proven design provides uniform inlet flow to compressor.



- 3. Journal Bearings** - bearings are tilting-pad type for improved rotor stability and are also pressure-fed for reduced break-away torque.
- 4. Compressor Blading** - an evolution from the 7EA compressor with a zero stage added. Blade length increased for added flow. Blade material upgraded for more demanding requirements. Shrouded stator 17 and exit guide vanes are utilized for improved cyclical life.
- 5. Compressor Design** - based on proven axial-flow design. One piece casing allows easier start-up. Casing material upgraded to accommodate higher temperature and pressure.
- 6. Rigid Forward Support** - in combination with forward thrust bearing, limits thermal expansion of gas turbine into generator.

- 7. Wheel Construction** - machined to nearly constant stress cross-section with contact faces at maximum diameter for high rotor stiffness.
- 8. Through-Bolt Construction** - large bolts at maximum bolt circle provide rigid rotor with required torque capability for front-end drive.
- 9. Inlet Orientation** - available in up, down or side arrangement.

### STATOR CASINGS

- 10. Horizontally Split** - all casings split on horizontal centerline with through-bolting to facilitate maintenance

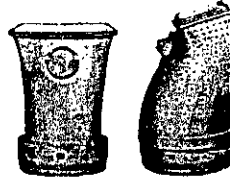
### COMBUSTION

- 11. Combustor Bulkhead** - combustor outer cans attached over elongated holes in combustor bulkhead to permit removal of transition piece without lifting turbine shell.
- 12. Top and Bottom Manway Access** - permits an alternative method for removing combustor transition piece and stage 1 nozzle without lifting turbine shell.
- 13. Fuel Distribution** - single fuel line connection for each combustor with manifolding to six fuel nozzles built into combustor and cover.
- 14. Reverse Flow Combustor Chambers** - supplement the impingement and film cooling of the liners, prolonging parts life.



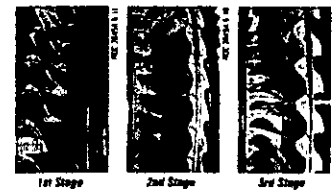
NC 3407-24

- 15. Impingement Cooled Combustor Transition Piece** - separates perforated sleeve around transition piece causes compressor discharge air to impinge on and effectively cool the transition piece.



### TURBINE

- 16. Nozzle Design** - sidewalls and internal surfaces of vanes impingement cooled with spent air used for extensive film cooling.
- 17. Stage 1 Stationary Shroud Design** - gas path insert of high temperature alloy, extensively convection, impingement and film cooled and coated for maintaining tight clearances with the stage 1 bucket tip.



- 18. Bucket Design** - stage 1 bucket is directionally solidified and uses a turbulated serpentine cooled design with trailing edge bleed cooling, based on GE Aircraft Engine technology. Stage 2 uses turbulated radial cooling holes. Stage 3 is uncooled. Stages 2 and 3 have integral z-lock shrouds for vibration control, and all three stages have long shanks for vibration control and isolation of gas path temperatures from the turbine wheels.

### EXHAUST

- 19. Exhaust Diffuser** - axial design (permitted by front-end drive) is blanket insulated for thermal stability, safety and reduced heat loss from exhaust before entering heat recovery system.
- 20. Exhaust Thermocouples** - sets of thermocouples supply signals to each of the three SPEEDTRONIC™ Mark V computers. The thermocouples are used for control and also for monitoring the combustion system.

Figure 2 - GE Combustion Turbine MS 7001FA

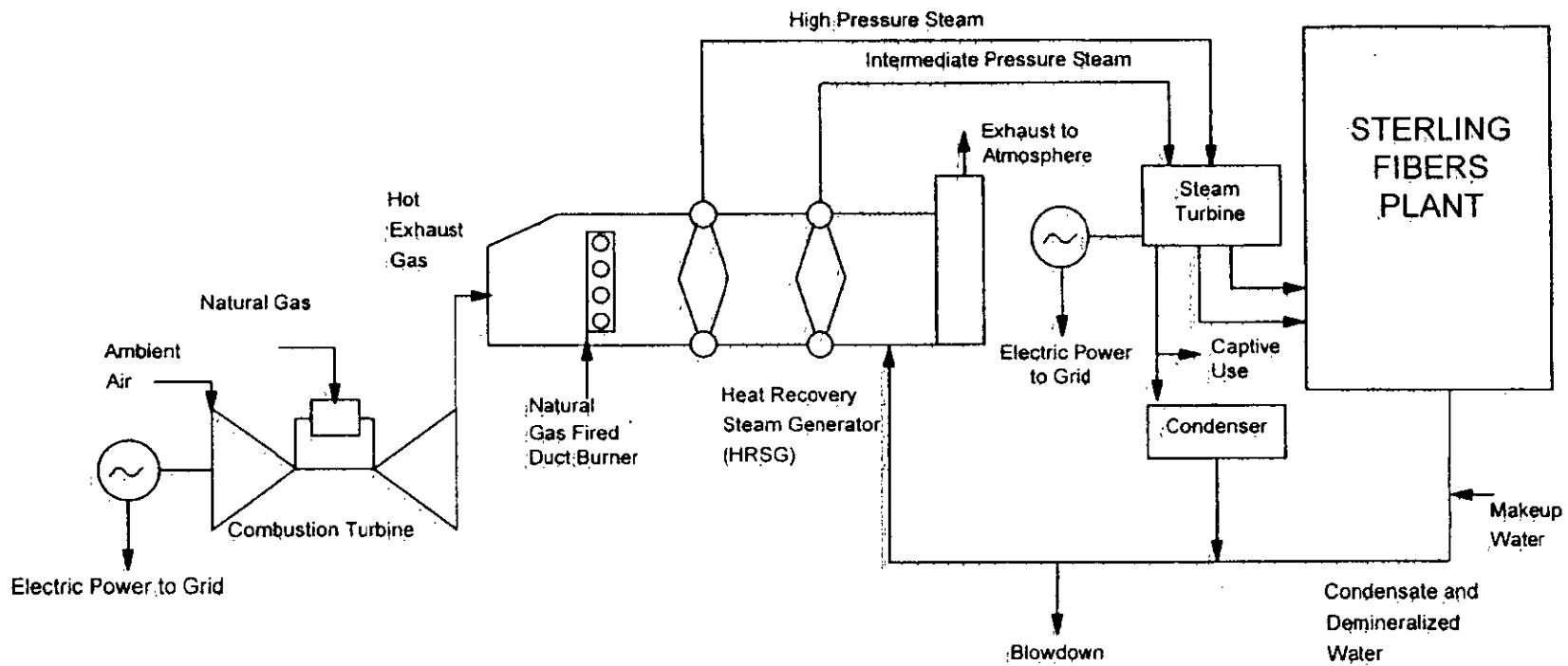


Figure 3 - Combined Cycle Cogeneration Process



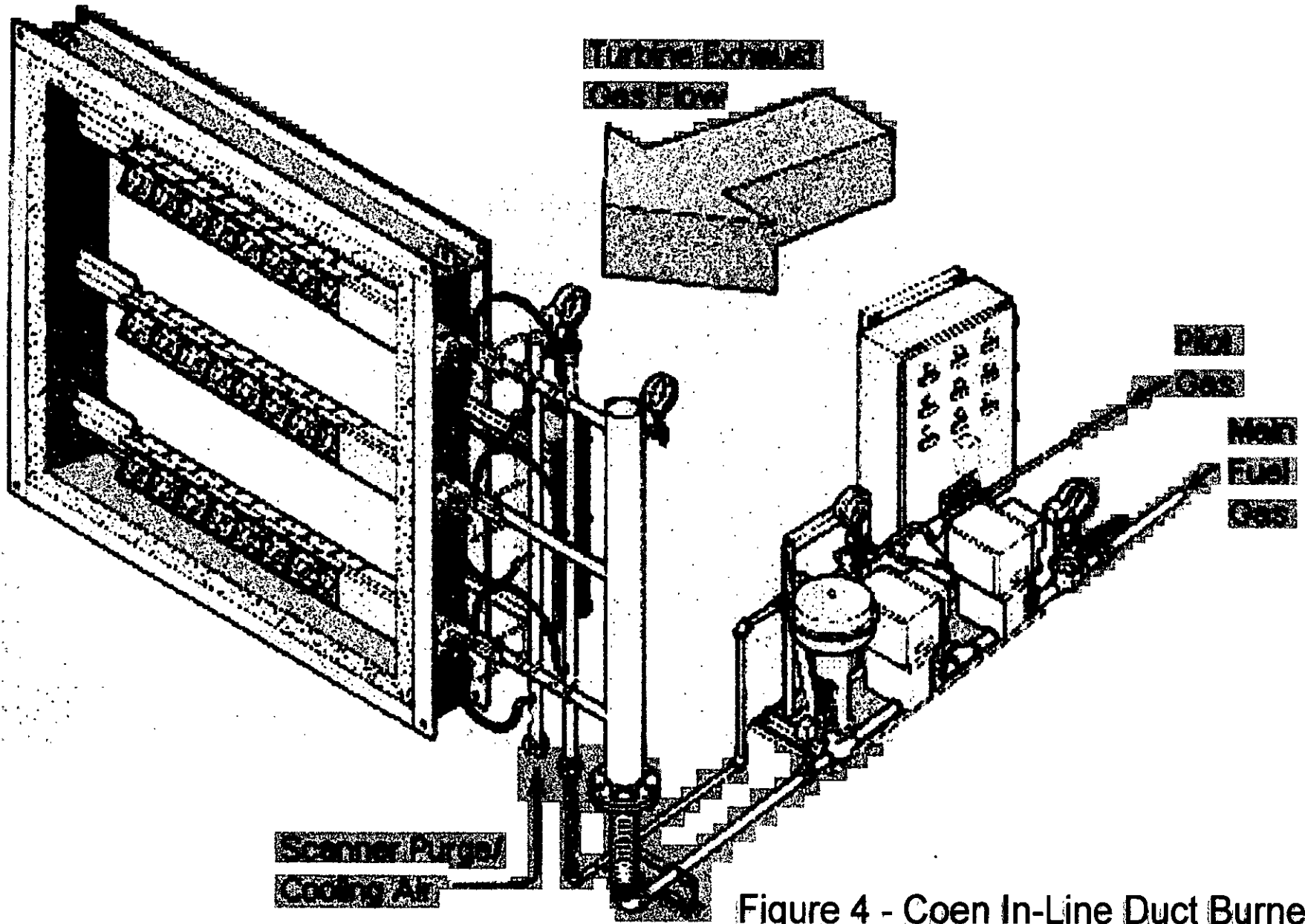


Figure 4 - Coen In-Line Duct Burner

**PERMITTEE:**

Santa Rosa Energy LLC  
650 Dundee Road  
Northbrook, Illinois 60062

*Authorized Representative:*

James Shield, Vice-President

DEP File No.	1130168-001-AC
Permit No.	PSD-FL-253
Project	241 MW Cogeneration Plant
SIC No.	4911
Expires:	December 31, 2001

**PROJECT AND LOCATION:**

Permit for the construction of a natural gas-fired cogeneration plant that will consist of a nominal 167 megawatt (MW) combustion turbine-electrical generator; a supplementary-fired heat recovery steam generator capable of raising sufficient steam to generate another 74 MW from a steam turbine-electrical generator and to meet the process steam requirements of the adjacent steam host; a 200 foot main stack; and ancillary equipment. The facility is designated as the Santa Rosa Energy Center and will be located within the boundary of the Sterling Fiber Chemical Plant in Pace, Santa Rosa, County.

UTM coordinates are: Zone 16; 488.970 km E and 3,381.350 km N.

**STATEMENT OF BASIS:**

This construction permit is issued under the provisions of Chapter 403 of the Florida Statutes (F.S.), and Chapters 62-4, 62-204, 62-210, 62-212, 62-296, and 62-297 of the Florida Administrative Code (F.A.C.). The above named permittee is authorized to modify the facility in accordance with the conditions of this permit and as described in the application, approved drawings, plans, and other documents on file with the Department of Environmental Protection (Department).

**ATTACHED APPENDICES MADE A PART OF THIS PERMIT:**

Appendix BD                      BACT Determination  
Appendix GC                      Construction Permit General Conditions

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Howard L. Rhodes, Director  
Division of Air Resources  
Management

**SECTION I. FACILITY INFORMATION**

**FACILITY DESCRIPTION**

This new major facility is a natural gas-fired 241 megawatt (MW) cogeneration plant that will consist of a nominal 167 megawatt (MW) combustion turbine-electrical generator; a supplementary-fired heat recovery steam generator capable of raising sufficient steam to generate another 74 MW from a steam turbine-electrical generator and to meet the process steam requirements of the adjacent steam host; a 200 foot main stack; and ancillary equipment. Supplemental firing will be by a duct burner rated at 585 million Btu per hour heat input.

Emissions from the combustion turbine will be controlled by Dry Low NO<sub>x</sub> combustors, use of pipeline natural gas and good combustion while emissions from the duct burner arrangement will be controlled by Low NO<sub>x</sub> burners, use of pipeline natural gas, and good combustion.

This Project, as presented, is exempt from the applicable requirements of Chapter 403, Part II, F.S., Electric Power Plant and Transmission Line Siting because the steam electric generating capacity of this facility is less than 75 MW. [F.S. Chapter 403.503 (12) Definitions]

The new facility will be located on the site of the steam host, Sterling Fiber, which is a manufacturer of acrylonitrile-based fibers.

**EMISSION UNITS**

This permit addresses the following emission units:

EMISSION UNIT NO.	SYSTEM	EMISSION UNIT DESCRIPTION
001	Power Generation	One nominal 167 Megawatt (nominal) Gas Combustion Turbine-Electrical Generator
002	Steam Generation	One 585 mmBtu/hr Duct Burner in a Supplementary Fired Heat Recovery Steam Generator (and 74 MW Steam Electrical Turbine)
003	Water Cooling	Cooling Tower

**SUBSECTION C. REGULATORY CLASSIFICATION**

The new facility will be classified as a Major or Title V Source of air pollution because emissions of nitrogen oxides (NO<sub>x</sub>) and carbon monoxide (CO) exceed 100 TPY. The new facility is within an industry included in the list of the 28 Major Facility Categories per Table 62-212.400-1, F.A.C. Because emissions will be greater than 100 TPY for CO and NO<sub>x</sub>, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) is required for these two pollutants.

# AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

## SECTION I. FACILITY INFORMATION

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Given that the project constitutes a Major Facility for CO or NO<sub>x</sub>, emissions greater than 40 TPY of sulfur dioxide (SO<sub>2</sub>) or volatile organic compounds (VOC), 25/15 TPY of particulate matter (PM/PM<sub>10</sub>), etc., also require review per the PSD rules and a BACT determination.

This facility is also subject to the provisions of Title IV, Acid Rain, Clean Air Act as amended in 1990.

### PERMIT SCHEDULE

- 10/XX/98 Notice of Intent published in \_\_\_\_\_.
- 10/09/98 Distributed Intent to Issue Permit.
- 09/08/98 Application deemed complete.
- 07/08/98 Received Application.

### RELEVANT DOCUMENTS

The documents listed below are the basis of the permit. They are specifically related to this permitting action, but not all are incorporated into this permit. These documents are on file with the Department.

- Application received July 8, 1998.
- Department letter dated August 3, 1998.
- EPA comments received August 11, 1998.
- Comments and additional information received from the applicant on September 8, 1998.
- Department's Intent to Issue and Draft permit (including Draft BACT Determination) issued October 9, 1998.
- Comments from the National Park Service received on 10/XX/98.
- Department's Final Determination and Best Available Control Technology Determination issued concurrently with this permit.

# AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

## SECTION II. ADMINISTRATIVE REQUIREMENTS

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1. Regulating Agencies: All documents related to applications for permits to construct, operate or modify an emissions unit should be submitted to the Bureau of Air Regulation (BAR), Florida Department of Environmental Protection (FDEP), at 2600 Blairstone Road, Tallahassee, Florida 32399-2400 and phone number (850)488-1344. All documents related to reports, tests, and notifications should be submitted to the DEP Northwest District office (DEPNW), 160 Governmental Center, Pensacola, Florida 32501-5794 and phone number 850/595-8300.
2. General Conditions: The owner and operator is subject to and shall operate under the attached General Permit Conditions G.1 through G.15 listed in Appendix GC of this permit. General Permit Conditions are binding and enforceable pursuant to Chapter 403 of the Florida Statutes. [Rule 62-4.160, F.A.C.]
3. Terminology: The terms used in this permit have specific meanings as defined in the corresponding chapters of the Florida Administrative Code.
4. Forms and Application Procedures: The permittee shall use the applicable forms listed in Rule 62-210.900, F.A.C. and follow the application procedures in Chapter 62-4, F.A.C. [Rule 62-210.900, F.A.C.]
5. Modifications: The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted sufficiently in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and the anticipated completion date of the change. [Chapters 62-210 and 62-212]
6. Permit Approval: Approval to construct shall become invalid if construction is not commenced within 18 months after receipt of such approval, or if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable time. The Department may extend the 18-month period upon a satisfactory showing that an extension is justified. [40 CFR 52.21(r)(2)].
7. Permit Extension: *This permit expires on December 31, 2001.* The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the Bureau of Air Regulation prior to 60 days before the expiration of the permit (Rule 62-4.080, F.A.C.).
8. BACT Determination: In conjunction with extension of the 18 month periods to commence or continue construction, or extension of the permit expiration date, the permittee may be required to demonstrate the adequacy of any previous determination of best available control technology for the source. [40 CFR 52.21(j)(4)]

**SECTION II. ADMINISTRATIVE REQUIREMENTS**

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9. Application for Title V Permit: An application for a Title V operating permit, pursuant to Chapter 62-213, F.A.C., must be submitted to the DEP's Bureau of Air Regulation, and a copy to the Department Northwest District office (DEPNW). [Chapter 62-213, F.A.C.]
10. New or Additional Conditions: Pursuant to Rule 62-4.080, F.A.C., for good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]
11. Annual Reports: Pursuant to Rule 62-210.370(2), F.A.C., Annual Operation Reports; the permittee is required to submit annual reports on the actual operating rates and emissions from this facility. Annual operating reports shall be sent to the DEP's Northwest District office by March 1st of each year.
12. Stack Testing Facilities: Stack sampling facilities shall be installed in accordance with Rule 62-297.310(6), F.A.C.
13. Quarterly Reports: Quarterly excess emission reports, in accordance with 40 CFR 60.7 (a)(7) (c) (1997 version), shall be submitted to the DEP's Northwest District office.

DRAFT

## AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

### SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

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#### APPLICABLE STANDARDS AND REGULATIONS:

1. Unless otherwise indicated in this permit, the construction and operation of the subject emission unit(s) shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of Chapter 403, F.S. and Florida Administrative Code Chapters 62-4, 62-103, 62-204, 62-210, 62-212, 62-213, 62-214, 62-296, 62-297; and the applicable requirements of the Code of Federal Regulations Section 40, Parts 60, 72, 73, and 75.
2. Issuance of this permit does not relieve the facility owner or operator from compliance with any applicable federal, state, or local permitting requirements or regulations. [Rule 62-210.300, F.A.C.]
3. These emission units shall comply with all applicable requirements of 40CFR60, Subpart A, General Provisions including:
  - 40CFR60.7, Notification and Recordkeeping
  - 40CFR60.8, Performance Tests
  - 40CFR60.11, Compliance with Standards and Maintenance Requirements
  - 40CFR60.12, Circumvention
  - 40CFR60.13, Monitoring Requirements
  - 40CFR60.19, General Notification and Reporting requirements
4. ARMS Emission Unit 001, Power Generation, consisting of a 167 megawatt combustion turbine shall comply with all applicable provisions of 40CFR60, Subpart GG, Standards of Performance for Stationary Gas Turbines, adopted by reference in Rule 62-204.800(7)(b), F.A.C. The Subpart GG requirement to correct test data to ISO conditions applies. However, such correction is not used for compliance determinations with the BACT standard(s).
5. ARMS Emission Unit 002, Steam Generation, consisting of a supplementary-fired heat recovery steam generator equipped with a 585 mmBTU/hr Duct Burner shall comply with all applicable provisions of 40CFR60, Subpart Da, Standards of Performance for Electric Utility Generating Units for Which Construction is Commenced After September 18, 1978, adopted by reference in Rule 62-204.800(7)(b), F.A.C. The modification of 40CFR60, Subpart Da promulgated on September 3, 1998 also applies to this project.
6. ARMS Emission Unit 003, Cooling Tower, is an unregulated emission unit.
7. All notifications and reports required by the above specific conditions shall be submitted to the DEP's Northwest District office.

#### GENERAL OPERATION REQUIREMENTS

8. Fuels: Only pipeline natural gas shall be fired in these units. [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]

## AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

### SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

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9. Turbine Capacity: The maximum heat input rates, based on the lower heating value (LHV) of the fuel at ambient conditions of 59°F temperature, 60% relative humidity, 100% load, and 14.7 psi pressure shall not exceed 1,600 Btu per hour (mmBtu/hr). These maximum heat input rates will vary depending upon ambient conditions and the combustion turbine characteristics. Manufacturer's curves corrected for site conditions or equations for correction to other ambient conditions shall be provided to the Department of Environmental Protection (DEP) within 45 days of completing the initial compliance testing. [Design, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]
10. Heat Recovery Steam Generator equipped with Duct Burner. The maximum heat input rate, shall not exceed 585 mmBtu/hour. Annual natural gas usage in the Duct Burner shall not exceed  $3,280 \times 10^6$  scf. [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]
11. Unconfined Particulate Emissions: During the construction period, unconfined particulate matter emissions shall be minimized by dust suppressing techniques such as covering and/or application of water or chemicals to the affected areas, as necessary.
12. Plant Operation - Problems: If temporarily unable to comply with any of the conditions of the permit due to breakdown of equipment or destruction by fire, wind or other cause, the owner or operator shall notify the DEP Northwest District office as soon as possible, but at least within (1) working day, excluding weekends and holidays. The notification shall include: pertinent information as to the cause of the problem; the steps being taken to correct the problem and prevent future recurrence; and where applicable, the owner's intent toward reconstruction of destroyed facilities. Such notification does not release the permittee from any liability for failure to comply with the conditions of this permit and the regulations. [Rule 62-4.130, F.A.C.]
13. Operating Procedures: Operating procedures shall include good operating practices and proper training of all operators and supervisors. The good operating practices shall meet the guidelines and procedures as established by the equipment manufacturers. All operators (including supervisors) of air pollution control devices shall be properly trained in plant specific equipment. [Rule 62-4.070(3), F.A.C.]
14. Circumvention: The owner or operator shall not circumvent the air pollution control equipment or allow the emission of air pollutants without this equipment operating properly. [Rules 62-210.650, F.A.C.]
15. Maximum allowable hours of operation for the 241 MW Cogeneration Plant are 8760. [Applicant Request, Rule 62-210.200, F.A.C. (Definitions - Potential Emissions)]



AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

**SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS**

**CONTROL TECHNOLOGY**

16. Dry Low NO<sub>x</sub> (DLN) combustors shall be installed on the stationary combustion turbine and Low NO<sub>x</sub> burners shall be installed in the duct burner arrangement to comply with the NO<sub>x</sub> emissions limits listed in Specific Condition 20 and 21. [Design, Rules 62-4.070 and 62-212.400, F.A.C.]
17. The permittee may design the heat recovery steam generator to accommodate installation of selective catalytic reduction or selective non-catalytic reduction or oxidation catalyst technologies and comply with the corresponding NO<sub>x</sub> and CO limits listed in Specific Conditions 20, 21 and 22. [Rules 62-212.400 and 62-4.070, F.A.C.]
18. The permittee shall design these units to accommodate adequate testing and sampling locations for compliance with the applicable emission limits (per each unit) listed in Specific Conditions No. 20 through 26. [Rule 62-4.070, Rule 62-204.800, F.A.C., and 40 CFR60.40a(b)]
19. The permittee shall provide manufacturer's emissions performance versus load diagrams for the DLN systems prior to their installation. DLN systems shall each be tuned upon initial operation to optimize emissions reductions and shall be maintained to minimize NO<sub>x</sub> emissions and CO emissions. [Rule 62-4.070, and 62-210.650 F.A.C.]

**EMISSION LIMITS AND STANDARDS**

20. The following table is a summary of the BACT determination and is followed by the applicable specific conditions. Values for NO<sub>x</sub> are corrected to 15 % O<sub>2</sub>. These limits or their equivalent in terms of lb/hr or NSPS units, as well as the applicable averaging times, are followed by the applicable specific conditions. Each Unit shall be tested alone to comply with the applicable NSPS and as a Combined Unit to comply with the BACT limits as indicated below: [Rules 62-212.400, 62-204.800(7)(b) (Subpart GG and Da), 62-210.200 (Definitions-Potential Emissions) F.A.C.]

Operational Mode	NO <sub>x</sub> (ppm)	CO (ppm)	VOC (ppm)	VE (%)	SO <sub>2</sub> (gr S/100 scf)	Comments
Combustion Turbine On Duct Burner Off	9 (24-Hr) - DLN 6 (3-Hr) - SCR	9	1.4	10	<20 - (fuel)	Natural Gas Good Combustion
Combustion Turbine On Duct Burner On	9.8 (24-Hr) - DLN/Low NO <sub>x</sub> 6 (3-Hr) - DLN/SCR 6 (3-Hr) - DLN/SNCR	24	8	10	<20 - (fuel)	Natural Gas Good Combustion

**SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS**

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21. Nitrogen Oxides (NO<sub>x</sub>) Emissions:

- The concentration of NO<sub>x</sub> in the stack exhaust gas, with the combustion turbine operating and the duct burner on shall not exceed 9.8 ppmvd at 15% O<sub>2</sub> (24-hr block average), and with the combustion turbine operating and the duct burner off shall not exceed 9 ppmvd at 15% O<sub>2</sub> (24-hour block average). Emissions of NO<sub>x</sub> in the stack exhaust gas (at ISO conditions) with the combustion turbine operating shall not exceed 106 pounds per hour (lb/hr) with the duct burner on and 64.1 lb/hr with the duct burner off to be demonstrated by initial stack test. [40CFR60 Subpart GG, Subpart Da and Rule 62-212.400, F.A.C.]
- If selective catalytic or non-catalytic reduction technology is installed, the concentration of NO<sub>x</sub> in the stack exhaust gas, with the combustion turbine operating and the duct burner on or off, shall not exceed 6 ppmvd @15% O<sub>2</sub> on a 3-hr block average. Compliance will be determined by the continuous emission monitor (CEMS). Emissions of NO<sub>x</sub> in the stack exhaust gas (at ISO conditions) with the combustion turbine operating shall not exceed 71 pounds per hour (lb/hr) with the duct burner on and 42.4 lb/hr with the duct burner off to be demonstrated by initial stack test. [40CFR60 Subpart GG, Subpart Da and Rule 62-212.400, F.A.C.]
- Emissions of NO<sub>x</sub> from the duct burner shall not exceed 0.4 lb/MW-hr (gross output). [Rule 62-212.400, F.A.C. and 40CFR60 Subpart Da]
- When NO<sub>x</sub> monitoring data is not available, substitution for missing data shall be handled as required by Title IV (40 CFR 75) to calculate any specified average time.

22. Carbon Monoxide (CO) Emissions: Emissions of CO in the stack exhaust gas (at ISO conditions) with the combustion turbine operating shall exceed neither 24 ppm nor 75 lb/hr with the duct burner on and 9 ppm nor 29 lb/hr with the duct burner off to be demonstrated by stack test using EPA Method 10. [Rule 62-212.400, F.A.C.]

23. Volatile Organic Compounds (VOC) Emissions: Emissions of VOC in the stack exhaust gas (at ISO conditions) with the combustion turbine operating shall exceed neither 8 ppm nor 14 lb/hr with the duct burner on and 1.4 ppm nor 2.9 lb/hr with the duct burner off to be demonstrated by initial stack test using EPA Method 18, 25 or 25A. [Rule 62-212.400, F.A.C.]

24. Sulfur Dioxide (SO<sub>2</sub>) Emissions: SO<sub>2</sub> emissions shall be limited by firing only pipeline natural gas (sulfur content less than 20 grains per 100 standard cubic foot). Compliance this requirement with in conjunction with implementation of the Custom Fuel Monitoring Schedule in Specific Condition 45 will demonstrate compliance with the applicable NSPS SO<sub>2</sub> emissions limitations from the duct burner or the combustion turbine. [40CFR60 Subparts Da and GG and Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C.]

## AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

### SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

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25. Particulate Matter emissions : PM/PM<sub>10</sub> emissions from the *duct burner* shall not exceed 0.03 lb/mmBTU measured by Method 5 or Method 17. Drift eliminators shall be installed on the cooling tower to reduce PM/PM<sub>10</sub> emissions. [40CFR60 Subpart Da and 62-4.070 F.A.C.]
26. Visible emissions (VE): VE emissions shall serve as a surrogate for PM/PM<sub>10</sub> emissions from the combustion turbine operating with or without the duct burner and shall not exceed 10 percent opacity from the stack. [40CFR60 Subpart Da, Rules 62-4.070, 62-212.400, and 62-204.800(7), F.A.C.]

#### EXCESS EMISSIONS

27. Excess emissions resulting from startup, shutdown, or malfunction shall be permitted provided that best operational practices are adhered to and the duration of excess emissions shall be minimized. Excess emissions occurrences shall in no case exceed two hours in any 24-hour period except during both "cold start-up" to or shutdowns from cogeneration plant operation. During cold start-up to combined cycle operation, up to four hours of excess emissions are allowed. During shutdowns from combined cycle operation, up to three hours of excess emissions are allowed. Cold start-up is defined as a startup to combined cycle operation following a complete shutdown lasting at least 48 hours. [Applicant Request, G.E. Combined Cycle Startup Curves Data and Rule 62-210.700, F.A.C.]
28. Excess emissions entirely or in part by poor maintenance, poor operation, or any other equipment or process failure that may reasonably be prevented during startup, shutdown or malfunction, shall be prohibited pursuant to Rule 62-210.700, F.A.C. These emissions shall be included in the 24-hr average for NO<sub>x</sub>.
29. Excess Emissions Report: If excess emissions occur for more than two hours due to malfunction, the owner or operator shall notify DEP's Northwest District office within (1) working day of: the nature, extent, and duration of the excess emissions; the cause of the excess emissions; and the actions taken to correct the problem. In addition, the Department may request a written summary report of the incident. Pursuant to the New Source Performance Standards, all excess emissions shall also be reported in accordance with 40 CFR 60.7, Subpart A. Following this format, 40 CFR 60.7, periods of startup, shutdown, malfunction, shall be monitored, recorded, and reported as excess emissions when emission levels exceed the permitted standards listed in Specific Condition No. 20 and 21. [Rules 62-4.130, 62-204.800, 62-210.700(6), F.A.C., and 40 CFR 60.7 (1997 version)].

#### COMPLIANCE DETERMINATION

30. Compliance with the allowable emission limiting standards shall be determined within 60 days after achieving the maximum production rate, but not later than 180 days of initial operation of the unit, and annually thereafter as indicated in this permit, by using the following reference methods as described in 40 CFR 60, Appendix A (1997 version), and adopted by reference in Chapter 62-204.800, F.A.C.

# AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

## SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

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31. Initial (I) performance tests shall be performed by the deadlines in condition 30. Initial tests shall also be conducted after any modifications (and shake down period not to exceed 100 days after re-starting the CT) of air pollution control equipment, including installation of SCR or SNCR (if required). Annual (A) compliance tests shall be performed during every federal fiscal year (October 1 - September 30) pursuant to Rule 62-297.310(7), F.A.C., on these units as indicated. The following reference methods shall be used. No other test methods may be used for compliance testing unless prior DEP approval is received in writing.
- EPA Reference Method 5 or Method 17, Determination of Particulate Emissions From Stationary Sources (I, at stack only).
  - EPA Reference Method 9, "Visual Determination of the Opacity of Emissions from Stationary Sources" (I, A).
  - EPA Reference Method 10, "Determination of Carbon Monoxide Emissions from Stationary Sources" (I, A).
  - EPA Reference Method 20, "Determination of Oxides of Nitrogen Oxide, Sulfur Dioxide and Diluent Emissions from Stationary Gas Turbines." Initial test only for compliance with 40CFR60 Subpart GG, Da. NO<sub>x</sub> BACT limits compliance by CEMs (24-hr average or 3-hr average if SCR/SNCR is required).
  - EPA Reference Method 18, and/or 25A, "Determination of Volatile Organic Concentrations." Initial test only.
32. Continuous compliance with the NO<sub>x</sub> emission limits: Continuous compliance with the NO<sub>x</sub> emission limits shall be demonstrated with the CEM system based on the applicable averaging time of 24-hr block average (DLN) or a 3-hr average (if SCR is used). Based on CEMS data, a separate compliance determination is conducted at the end of each operating day (or 3-hr period when applicable) and a new average emission rate is calculated from the arithmetic average of all valid hourly emission rates from the previous operating day (or 3-hr period when applicable). Valid hourly emission rates shall not include periods of start up, shutdown, or malfunction unless prohibited by 62-210.700 F.A.C. A valid hourly emission rate shall be calculated for each hour in which at least two NO<sub>x</sub> concentrations are obtained at least 15 minutes apart. These excess emissions periods shall be reported as required in Condition 29. [Rules 62-4.070 F.A.C., 62-210.700, F.A.C., 40 CFR 75 and BACT]
33. Compliance with the SO<sub>2</sub> and PM/PM<sub>10</sub> emission limits: Notwithstanding the requirements of Rule 62-297.340, F.A.C., the use of pipeline natural gas, is the method for determining compliance for SO<sub>2</sub> and PM<sub>10</sub>. For the purposes of demonstrating compliance with the 40 CFR 60.333 SO<sub>2</sub> standard, ASTM methods D4084-82 or D3246-81 (or equivalent) for sulfur content of gaseous fuel shall be utilized in accordance with the EPA-approved custom fuel monitoring schedule or natural gas supplier data may be submitted or the natural gas sulfur content referenced in 40 CFR 75 Appendix D may be utilized. However, the applicant is responsible for ensuring that the procedures in 40 CFR60.335 or 40 CFR75 are used when

## AIR CONSTRUCTION PERMIT PSD-FL-253 (1130168-001-AC)

### SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS

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determination of fuel sulfur content is made. Analysis may be performed by the owner or operator, a service contractor retained by the owner or operator, the fuel vendor, or any other qualified agency pursuant to 40 CFR 60.335(e) (1997 version).

34. Compliance with CO emission limit: An initial test for CO, shall be conducted concurrently with the initial NO<sub>x</sub> test, as required. The initial NO<sub>x</sub> and CO test results shall be the average of three valid one-hour runs. Annual compliance testing for CO may be conducted concurrent with the annual RATA testing for the NO<sub>x</sub> CEMS required pursuant to 40 CFR 75.
35. Compliance with the VOC emission limit: An initial test is required to demonstrate compliance with the VOC emission limit. Thereafter, CO emission limit will be employed as surrogate and no annual testing is required.
36. Testing procedures: Testing of emissions shall be conducted with the combustion turbine operating at permitted capacity. Permitted capacity is defined as 95-100 percent of the maximum heat input rate allowed by the permit, corrected for the average ambient air temperature during the test (with 100 percent represented by a curve depicting heat input vs. ambient temperature). If it is impracticable to test at permitted capacity, the source may be tested at less than permitted capacity. In this case, subsequent operation is limited by adjusting the entire heat input vs. ambient temperature curve downward by an increment equal to the difference between the maximum permitted heat input (corrected for ambient temperature) and 105 percent of the value reached during the test until a new test is conducted. Once the unit is so limited, operation at higher capacities is allowed for no more than 15 consecutive days for the purposes of additional compliance testing to regain the permitted capacity. Procedures for these tests shall meet all applicable requirements (i.e., testing time frequency, minimum compliance duration, etc.) of Chapters 62-204 and 62-297, F.A.C.
37. Test Notification: The DEP's Northwest District office shall be notified, in writing, at least 30 days prior to the initial performance tests and at least 15 days before annual compliance test(s).
38. Special Compliance Tests: The DEP may request a special compliance test pursuant to Rule 62-297.310(7), F.A.C., when, after investigation (such as complaints, increased visible emissions, or questionable maintenance of control equipment), there is reason to believe that any applicable emission standard is being violated.
39. Test Results: Compliance test results shall be submitted to the DEP's Northwest District office no later than 45 days after completion of the last test run. [Rule 62-297.310(8), F.A.C.].

### NOTIFICATION, REPORTING, AND RECORDKEEPING

40. Records: All measurements, records, and other data required to be maintained by Santa Rosa Energy Center shall be recorded in a permanent form and retained for at least five (5) years following the date on which such measurements, records, or data are recorded. These records shall be made available to DEP representatives upon request.

**SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS**

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41. Compliance Test Reports: The test report shall provide sufficient detail on the tested emission unit and the procedures used to allow the Department to determine if the test was properly conducted and if the test results were properly computed. At a minimum, the test report shall provide the applicable information listed in Rule 62-297.310(8), F.A.C.

**MONITORING REQUIREMENTS**

42. Continuous Monitoring System: The permittee shall install, calibrate, maintain, and operate a continuous emission monitor in the stack to measure and record the nitrogen oxides emissions from these units. Periods when NO<sub>x</sub> emissions (lb/hr) are above the BACT standards, listed in Specific Condition No 20 and 21, shall be reported to the DEP Northwest District Office pursuant to Rule 62-4.160(8), F.A.C. [Rule 62-204.800 and 40 CFR 60.7 (1997 version)]
43. CEMS for reporting excess emissions: Subject to EPA approval, the NO<sub>x</sub> CEMS shall be used in lieu of the requirement for reporting excess emissions in accordance with 40 CFR 60.334(c)(1), Subpart GG (1997 version). Upon request from DEP, the CEMS emission rates for NO<sub>x</sub> on the CT shall be corrected to ISO conditions to demonstrate compliance with the NO<sub>x</sub> standard established in 40 CFR 60.332.
44. Continuous Monitoring System Reports: The monitoring devices shall comply with the certification and quality assurance, and any other applicable requirements of Rule 62-297.520, F.A.C., 40 CFR 60.13, including certification of each device in accordance with 40 CFR 60, Appendix B, Performance Specifications and 40 CFR 60.7(a)(5) or 40 CFR Part 75. Quality assurance procedures must conform to all applicable sections of 40 CFR 60, Appendix F or 40 CFR 75. Data on CEM equipment specifications, manufacturer, type, calibration and maintenance needs, and its proposed location (the monitoring plan) shall be provided to the Department's Emission Monitoring Section in Tallahassee for review at least 90 days prior to installation.
45. Natural Gas Monitoring Schedule: A custom fuel monitoring schedule pursuant to 40 CFR 75 Appendix D for natural gas may be used in lieu of the daily sampling requirements of 40 CFR 60.334 (b)(2) provided the following requirements are met:
- The permittee shall apply for an Acid Rain permit within the deadlines specified in 40 CFR 72.30.
  - The permittee shall submit a monitoring plan, certified by signature of the Designated Representative, that commits to using a primary fuel of pipeline supplied natural gas (sulfur content less than 20 gr/100 scf pursuant to 40 CFR 75.11(d)(2)).
  - Each unit shall be monitored for SO<sub>2</sub> emissions using methods consistent with the requirements of 40 CFR 75 and certified by the USEPA.

**SECTION III. EMISSION UNIT(S) SPECIFIC CONDITIONS**

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This custom fuel monitoring schedule will only be valid when pipeline natural gas is used as a primary fuel. If the primary fuel for these units is changed to a higher sulfur fuel, SO<sub>2</sub> emissions must be accounted for as required pursuant to 40 CFR 75.11(d).

46. Determination of Process Variables:

- The permittee shall operate and maintain equipment and/or instruments necessary to determine process variables, such as process weight input or heat input, when such data is needed in conjunction with emissions data to determine the compliance of the emissions unit with applicable emission limiting standards.
- Equipment and/or instruments used to directly or indirectly determine such process variables, including devices such as belt scales, weigh hoppers, flow meters, and tank scales, shall be calibrated and adjusted to indicate the true value of the parameter being measured with sufficient accuracy to allow the applicable process variable to be determined within 10% of its true value [Rule 62-297.310(5), F.A.C.]

47. Subpart Da Monitoring: The permittee shall comply with the applicable monitoring requirements of 40 CFR60, Subpart Da.

DRAFT 10/15/13

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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Santa Rosa Energy Center  
Permit No. 1130168-001-AC (PSD-FL-253)  
Pace, Santa Rosa County, Florida

**BACKGROUND**

The applicant, Santa Rosa Energy LLC (SREL), proposes to install a combined-cycle cogeneration plant at the Sterling Fibers Facility located at 5005 Sterling Way, Pace, Santa Rosa County. The proposed project will result in "significant increases" with respect to Table 62-212.400-2, Florida Administrative Code (F.A.C.) of emissions of particulate matter (PM and PM<sub>10</sub>), carbon monoxide (CO), volatile organic compounds (VOC), and nitrogen oxides (NO<sub>x</sub>). The project is therefore subject to review for the Prevention of Significant Deterioration (PSD) and a determination of Best Available Control Technology (BACT) in accordance with Rules 62-212.400, F.A.C.

The primary unit to be installed is a nominal 167 MW, General Electric 7FA combustion turbine-electrical generator, fired exclusively with pipeline natural gas. The project includes a supplementary-fired heat recovery steam generator (HRSG) and a steam turbine-electrical generator to produce an additional 74 MW of electrical power. A portion of the steam produced will be at the host Sterling Fibers Plant. The unit will exhaust through a 200-foot stack. Descriptions of the process, project, air quality effects, and rule applicability are given in the Technical Evaluation and Preliminary Determination dated October 7, 1998, accompanying the Department's Intent to Issue.

**DATE OF RECEIPT OF A BACT APPLICATION:**

The application was received on July 8, 1998 and included a proposed BACT proposal prepared by the applicant's consultant, Roy F. Weston. Additional information amending the application and BACT proposal was received on September 8.

**REVIEW GROUP MEMBERS:**

A. A. Linero, P.E., and Teresa Heron, Review Engineer

**BACT DETERMINATION REQUESTED BY THE APPLICANT:**

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
Particulate Matter	Pipeline Natural Gas Combustion Controls	0.0051 lb/MMBtu (CT) 0.0080 lb/MMBtu (DB)
Volatile Organic Compounds	As Above	1.4 ppm (CT) 0.0190 lb/MMBtu (DB)
Carbon Monoxide	As Above	9 ppm (CT) 0.080 lb/MMBtu (DB)
Nitrogen Oxides	Dry Low NO <sub>x</sub> Combustors Dry Low NO <sub>x</sub> Burners	9 ppm @ 15% O <sub>2</sub> (CT) 0.08 lb/mmBtu (DB)

According to the revised application, the units, would emit approximately 402 tons per year (TPY) of NO<sub>x</sub>, 260 TPY of CO, 45 TPY of VOC, 7 TPY of SO<sub>2</sub>, and 55 TPY of PM/PM<sub>10</sub>.



**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**BACT DETERMINATION PROCEDURE:**

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- All scientific, engineering, and technical material and other information available to the Department.
- The emission limiting standards or BACT determination of any other state.
- The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically unfeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

**STANDARDS OF PERFORMANCE FOR NEW STATIONARY SOURCES:**

The minimum basis for a BACT determination is 40 CFR 60, Subpart GG, Standards of Performance for Stationary Gas Turbines (NSPS). Subpart GG was adopted by the Department by reference in Rule 62-204.800, F.A.C. The key emission limits required by Subpart GG are 75 ppm NO<sub>x</sub> @15% O<sub>2</sub> (assuming 25 percent efficiency) and 150 ppm SO<sub>2</sub> @15% O<sub>2</sub> (or <0.8% sulfur in fuel). The BACT proposed by SERL is consistent with Subpart GG NSPS which allows NO<sub>x</sub> emissions of approximately 110 ppm for the high efficiency unit to be purchased by the Santa Rosa Energy LLC.

The fired duct burner required for supplementary gas-firing of the HRSG is subject to 40 CFR 60, Subpart Da, Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978. The BACT proposed by SERL is consistent with the key historically applicable NSPS requirement of 0.20 pounds of NO<sub>x</sub> per million Btu heat input (lb NO<sub>x</sub>/mmBtu). It is well below the revised Subpart Da output-based limit of 1.6 lb NO<sub>x</sub>/MW-hr promulgated on September 3, 1998.

No National Emission Standards for Hazardous Air Pollutants exist for stationary gas turbines or gas-fired duct burners.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

**DETERMINATIONS BY EPA AND STATES:**

The following table is a sample of information on recent limitations set by EPA and the States for comparable stationary gas turbine.

Project Location	Power Output and Duty	NO <sub>x</sub> Limit ppm @ 15% O <sub>2</sub> and Fuel	Technology	Comments
Lakeland, FL	350 MW CC CON	9/9/7.5 - NG 42/15/15 - No. 2 FO	DLN/HSCR/SCR WI/HSCR/SCR	230 MW WH 501G CT Initially 250 MW simple cycle and 25 ppm NO <sub>x</sub> limit on gas
Mid-GA Cogen	308 MW CC CON	9 - NG 20 - No. 2 FO	DLN & SCR	2x119 MW WH 501D5A CTs
Fort Myers, FL	1500 MW CC CON	9 - NG	DLN	6x170 MW GE MS 7241 CTs Draft Permit, Non-BACT
Tiger Bay, FL	270 MW CC CON	15/10 - NG 42 - No. 2 FO	DLN &/or SCR WI	184 MW GE-MS7001FA-CT DLN/15,ppm.or SCR/10 ppm
Hines Polk, FL	485 MW CC CON	12 - NG 42 - No. 2 FO	DLN WI	2x165 MW WH 501FC CTs Cancelled GE CTs
Tallahassee, FL	260 MW CC CON	12 - NG 42 - No. 2 FO	DLN WI	160 MW GE MS 7231FA CT DLN guarantee is 9 ppm
Eco-Electrica, PR	461 MW CC CON	7 - NG 9 - LPG, No. 2 FO	DLN & SCR	2x160 MW WH 501F CTs
Sithe/IPP, NY	1012 MW CC CON	4.5 - NG	DLN & SCR	4x160 MW GE 7FA CTs
Hermiston, OR	474 MW CC CON	4.5 - NG	SCR	2x160 MW GE 7FA CTs
Barry, AL	800 MW CC CON	3.5 - NG (CT/DB)	DLN & SCR	3x170 MW GE 7FA CTs

CC = Combined Cycle      CON = Continuous      DLN = Dry Low NO<sub>x</sub> Combustion      GE = General Electric  
 DB = Duct Burner      HSCR = Hot SCR      SCR = Selective Catalytic Reduction      WH = Westinghouse  
 NG = Natural Gas      FO = Fuel Oil      LPG = Liquefied Propane Gas      ABB = Asea Brown Bovari  
 CT = Combustion Turbine      ISO = 59°F      WI = Water or Steam Injection      ppm = parts per million  
 Factors in Common with Santa Rosa Energy LLC Project are bolded.

Project Location	CO - ppm (or lb/mmBtu)	VOC - ppm (or lb/mmBtu)	PM - lb/mmBtu (or gr/dscf or lb/hr)	Technology and Comments
Lakeland, FL	25 - NG or 10 by Ox. Cat 75 - FO @ 15% O <sub>2</sub>	4 - NG 10 - FO	10% Opacity	Clean Fuels Good Combustion
Mid-GA Cogen,	10 - NG 30 - FO	6 - NG 30 - FO	18 lb/hr - NG 55 lb/hr - FO	Clean Fuels Good Combustion
Fort Myers, FL	12 - NG @ 15% O <sub>2</sub>	1.4 - NG	10% Opacity	Clean Fuels Good Combustion
Tiger Bay, FL	0.045 lb/mmBtu-NG 0.053 lb/mmBtu-FO		0.053 - NG 0.009 - FO	Clean Fuels Good Combustion
Hines Polk, FL	25 - NG 30 - FO	7 - NG 7 - FO	0.006 - NG 0.01 - FO	Clean Fuels Good Combustion
Tallahassee, FL	25 - NG 90 - FO			Clean Fuels Good Combustion
Eco-Electrica, PR	33 - NG/LPG @15% O <sub>2</sub> 33 - FO @15% O <sub>2</sub>	1.5/2.5 - NG/LPG 6 - FO	0.0053 - NG/LPG 0.0390 - FO	Clean Fuels Good Combustion
Sithe/IPP, NY	13 - NG		10% Opacity	Clean Fuels Good Combustion
Hermiston, OR	15 - NG			Clean Fuels Good Combustion
Barry, AL	0.034 lb/mmBtu - NG/CT 0.057 lb/mmBtu - CT/DB	0.015 lb/mmBtu After CT and DB	0.011 lb/mmBtu - CT/DB 10% Opacity	Gas Only Good Combustion

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

The following table is a sample of information on recent NO<sub>x</sub> limitation by EPA and the States for combined cycle and cogeneration projects incorporating supplementary-firing in heat recovery steam generators.

Project Location	Duct Burner Rated Heat Input (mmBtu/hr)	NO <sub>x</sub> Limit (lb/mmBtu or ppm)	Technology	Comments
Plant Berry, AL	159	0.018 mmBtu/hr	DLN, SCR	3x170 MW GE 7FA CTs 3 Duct Burners
Saranac Energy, NY	553	0.08 lb/mmBtu	SCR	2 GE 7EA CTs with DBs Permit issued 1992
Bermuda HEL, VA	197	9 ppm	Steam Injection, SCR	1175 mmBtu/hr CT (1992)
Bear Island Paper, VA	129	9 ppm	SCR	474 mmBtu/hr CT (1992)
Pilgrim Energy, NY	214	4.5 ppm (CT) 0.012 lb/mmBtu (DB)	Steam Injection, SCR Low NO <sub>x</sub> Burner, SCR	2 WH 501D5 CTs 2 Duct Burners
Selkirk Cogen, NY	206	9 ppm (CT) 0.018 lb/mmBtu (DB)	Low NO <sub>x</sub> Burner, SCR	1173 mmBtu/hr CT
Grays Ferry, PA	366	9 ppm (CT) 0.09 lb/mmBtu (DB)	DLN Low NO <sub>x</sub> Burner	WH 501D5A CT with DB DLN Failed, SCR Required

**OTHER INFORMATION AVAILABLE TO THE DEPARTMENT:**

Besides the information submitted by the applicant and that mentioned above, other information available to the Department consists of:

- Letter from EPA Region IV dated August 11, 1998
- DOE website information on Advanced Turbine Systems Project
- Alternative Control Techniques Document - NO<sub>x</sub> Emissions from Stationary Gas Turbines
- General Electric 39th Turbine State-of-the-Art Technology Seminar Proceedings
- GE Power Generation - Speedtronic™ Mark V Gas Turbine Control System
- GE Combined Cycle Startup Curves
- Coen website information and brochure on Duct Burners

**COMBUSTION TURBINE AND DUCT BURNER CONTROL TECHNOLOGIES:**

The applicant presented an analyses of the different available control technologies for all of the pollutants subject to PSD review and a BACT determination. The applicability of these measures is best understood in conduction with the mechanisms by the pollutants are generated.

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**Nitrogen Oxides Formation**

Much of the discussion in this section is based on a 1993 EPA document on Alternative Control Techniques for NO<sub>x</sub> Emissions from Stationary Gas Turbines. Project-specific information is included where applicable.

Nitrogen oxides form in the gas turbine combustion process as a result of the dissociation of molecular nitrogen and oxygen to their atomic forms and subsequent recombination into seven different oxides of nitrogen. Thermal NO<sub>x</sub> forms in the high temperature area of the gas turbine combustor. Thermal NO<sub>x</sub> increases exponentially with increases in flame temperature and linearly with increases in residence time. Flame temperature is dependent upon the ratio of fuel burned in a flame to the amount of fuel that consumes all of the available oxygen.

By maintaining a low fuel ratio (lean combustion), the flame temperature will be lower, thus reducing the potential for NO<sub>x</sub> formation. Prompt NO<sub>x</sub> is formed in the proximity of the flame front as intermediate combustion products. The contribution of Prompt to overall NO<sub>x</sub> is relatively small in lean, near-stoichiometric combustors and increases for leaner fuel mixtures. This provides a practical limit for NO<sub>x</sub> control by lean combustion.

Fuel NO<sub>x</sub> is formed when fuels containing bound nitrogen are burned. This phenomenon is not important when combusting natural gas. It is not important for the SREL project because only natural gas will be used.

Uncontrolled emissions range from about 100 to over 600 parts per million by volume, dry, corrected to 15 percent oxygen (ppm @15% O<sub>2</sub>). For large modern turbines, the Department estimates uncontrolled emissions at approximately 200 ppm @15% O<sub>2</sub>.

The potential for NO<sub>x</sub> emissions from gas-fired duct burners is lower than from gas turbines because of the lower temperature and pressure. In a supplementary-fired duct burner, the gas to the HRSG is raised from approximately 1100 to less than 1800 °F. Thermal NO<sub>x</sub> formation essentially ceases at temperatures below 2000 °F.<sup>1</sup> Since the fuel contains virtually no nitrogen, there is little potential for fuel NO<sub>x</sub> formation either.

**NO<sub>x</sub> Control Techniques**

Combustion Controls

The excess air in lean combustion, cools the flame and reduces the rate of thermal NO<sub>x</sub> formation. Lean premixing of fuel and air prior to combustion can further reduce NO<sub>x</sub> emissions. This is accomplished by minimizing localized fuel-rich pockets (and high temperatures) that can occur when trying to achieve lean mixing within the combustion zones.

The above principle is depicted in Figure 1 for a General Electric DLN-1 can-annular combustor operating on gas. For ignition, warm-up, and acceleration to approximately 20 percent load, the first stage serves as the complete combustor. Flame is present only in the first stage, which is operated as lean stable combustion will permit. With increasing load, fuel is introduced into the secondary stage, and combustion takes place in both stages. When the load reaches approximately 40 percent, fuel is cut off to the first stage and the flame in this stage is extinguished. The venturi ensures the flame in the second stage cannot propagate upstream to the first stage. When the fuel

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**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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in the first-stage flame is extinguished (as verified by internal flame detectors), fuel is again introduced into the first stage, which becomes a premixing zone to deliver a lean, unburned, uniform mixture to the second stage. The second stage acts as the complete combustor in this configuration.

To further reduce NO<sub>x</sub> emissions, GE developed the DLN-2 (cross section shown in Figure 1) wherein air usage (other than for premixing) was minimized. The venturi and the centerbody assembly were eliminated and each combustor has a single burning zone. So-called "quaternary fuel" is introduced through pegs located on the circumference of the outward combustion casing.

The emission characteristics of General Electric's DLN 2 combustors are given in Figure 2. NO<sub>x</sub> concentrations are higher in the exhaust at lower loads because at lower loads, the combustor do not operate in the lean pre-mix mode. Therefore such a combustor emits NO<sub>x</sub> at concentrations of 25 parts per million (ppm) at loads between 50 and 100 percent of capacity, but concentrations as high as 100 ppm at less than 50 percent of capacity. GE has since further upgraded its combustors and this description is not precise for its more advanced DLN-2.6.

Simplified cross sectional views of the totally premixed DLN-2.6 combustor to be installed at the SREL project are shown in Figure 3. The combustor is similar to the DLN-2 with the addition of a sixth (center) fuel nozzle to achieve 9 ppm of NO<sub>x</sub> and 9 ppm of CO at somewhat less than 50 percent load. Presumably the emission characteristics of the DLN-2.6 are similar to the DLN 2, except that the combustor emits NO<sub>x</sub> at concentrations of 9 ppm (instead of the 25 ppm shown in Figure 2) at loads between 50 and 100 percent. Because of the "totally pre-mixed" design, emissions at less than 50 percent load are probably also lower for the DLN 2.6 than the DLN-2.

In all but the most recent gas turbine combustor designs, the high temperature combustion gases are cooled to an acceptable temperature with dilution air prior to entering the turbine (expansion) section. The sooner this cooling occurs, the lower the thermal NO<sub>x</sub> formation. Cooling is also required to protect the first stage nozzle. When this is accomplished by air cooling, the air is injected into the component and is ejected into the combustion gas stream, causing a further drop in combustion gas temperature. This, in turn, results in a lower achievable thermal efficiency for the unit.

Larger units, such as the Westinghouse 501 G or the planned General Electric 7H, use steam in a closed loop system to provide much of the cooling. The fluid is circulated through the internal portion of the nozzle component or around the transition piece between the combustor and the nozzle and does not enter the exhaust stream. Instead it is normally sent back to the steam generator. The difference between flame temperature and firing temperature into the first stage is minimized and higher efficiency is attained.

Another important result of steam cooling is that a higher firing temperature can be attained with no increase in flame temperature. Flame temperatures and NO<sub>x</sub> emissions can therefore be maintained at comparatively low levels even at high firing temperatures. At the same time, thermal efficiency should be greater when employing steam cooling. A similar analysis applies to steam cooling around the transition piece between the combustor and first stage nozzle.

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**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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The relationship between flame temperature, firing temperature, unit efficiency, and  $\text{NO}_x$  formation can be appreciated from Figure 4 which is from a General Electric discussion on these principles. In addition to employing pre-mixing and steam cooling, further reductions are accomplished through design optimization of the burners, testing, further evaluation, etc.

At the present time, emissions achieved by combustion controls are low as 9 ppm (and even lower) from gas turbines smaller than about 200 MW (simple cycle), such as the F class. As in the case of wet injection, higher CO and hydrocarbon emissions can occur as a result of employing combustion controls to minimize  $\text{NO}_x$ .

Figure 5 is a diagram of a typical in-line duct burner configuration and individual burner manufactured by Coen, one of the potential providers of this equipment. The unit will reside within the duct between the combustion turbine outlet and the HRSG. The oxygen-rich, hot turbine exhaust is used to burn natural gas introduced through the burner arrangement. In contrast to the pre-mixing that can be accomplished in the combustion turbine, not much (other than design optimization) can be done regarding the manner by which the very large volume of hot combustion air and the fuel are mixed prior to combustion. Basically the burners are described as Low  $\text{NO}_x$  burners.

There have been reports of lower emissions (on a lb/mmBtu or ppm basis rather than on a lb/hr basis) with the duct burners on. It has been theorized that the results are "suspect" and may have been caused by the "inability to achieve and maintain identical operating conditions for the turbine during both sets of tests."<sup>2</sup> It has also been theorized that transformations between  $\text{NO}$  and  $\text{NO}_2$ , interfere with the test method.<sup>3</sup> As previously mentioned, since the duct burner operates at a lower temperature and pressure than the gas turbine, it is possible that concentrations may actually be lower with the duct burner on.

#### Selective Catalytic Combustion

Selective catalytic reduction (SCR) is an add-on  $\text{NO}_x$  control technology that is employed in the exhaust stream following the gas turbine. SCR reduces  $\text{NO}_x$  emissions by injecting ammonia into the flue gas. As of early 1992, over 100 gas turbine installations already used SCR in the United States. No combustion turbines in Florida employ SCR. Virtually all SCR units are used in combination with wet injection or combustion controls.

Ammonia reacts with  $\text{NO}_x$  in the presence of a catalyst and excess oxygen yielding molecular nitrogen and water. The catalyst used in combined cycle, low temperature applications (conventional SCR), is usually vanadium or titanium oxide and accounts for almost all installations. For high temperature applications (Hot SCR up to 1100 °F), such as simple cycle turbines, zeolite catalysts are available but used in few applications to-date.

In the past, sulfur was found to poison the catalyst material. Sulfur-resistant catalyst materials are now available, however, and catalyst formulation improvements have proven effective in resisting performance degradation with fuel oil in Europe and Japan, where conventional SCR catalyst life in excess of 4 to 6 years has been achieved, versus 8 to 10 years with natural gas.

In a manner analogous to balancing control of  $\text{NO}_x$  from the combustor with emissions of CO and hydrocarbon, similar balancing is required when controlling  $\text{NO}_x$  by SCR. Excessive ammonia use tends to increase emissions of CO, ammonia (slip), and particulate matter (when sulfur bearing fuels are used). Permit BACT limits as low as 3.5 ppm  $\text{NO}_x$  have been specified using SCR for an F Class project (with small in-line duct burners) in Alabama and proposed for another F Class project in Mississippi.

## APPENDIX BD

### BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

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#### Selective Non-Catalytic Combustion

Selective non-catalytic reduction (SNCR) reduction works on the same principle as SCR. The differences are that it is applicable to hotter streams than conventional or hot SCR, no catalyst is required, and urea can be used as a source of ammonia. No applications have been identified wherein SNCR was applied to a gas turbine because the exhaust temperature of 1100 °F is too low to support the NO<sub>x</sub> removal mechanism.

The acceptable temperature for the removal reactions is between 1400 and 2000 °F. A supplementary-fired unit (such as the SREL project) is defined as an HRSG fired to an average temperature not exceeding about 1800 °F. The 585 mmBtu/hr duct burner described by SREL will achieve temperatures close to this value. Although no SNCR applications are known, the technology appears to be feasible and possibly less complicated than SCR.

#### **Carbon Monoxide (CO) Control**

CO is emitted from combustion turbines due to incomplete fuel combustion. Combustion design and catalytic oxidation are the control alternatives that are viable for the project. The most stringent control technology for CO emissions is the use of an oxidation catalyst.

Most installations using catalytic oxidation are located in the Northeast. Among them are the 272 Berkshire, Massachusetts facility, 240 MW Brooklyn Navy Yard Facility, the 240 MW Masspower facility, the 165 MW Pittsfield Generating Plant in Massachusetts, and the 345 MW Selkirk Generating Plant in New York. Catalytic oxidation was recently installed at a cogeneration plant at Reedy Creek (Walt Disney World), Florida to avoid PSD review which would have been required due to increased operation at low load.

Most combustion turbines incorporate good combustion to minimize emissions of CO. These installations typically achieve emissions between 10 and 30 ppm at full load, even as they achieve relatively low NO<sub>x</sub> emissions by SCR or dry low NO<sub>x</sub> means. By comparison, the CT value of 9 ppm baseload proposed by SREL appears relatively low, but consistent with the capabilities of DLN-2.6 technology as discussed above. This proposed limits are achievable through good combustion practice. When simultaneously operating the combustion turbine and the duct burner, CO concentrations emissions will be less than 24 ppm which is within the range of limits set for combustion turbines operating alone. Annual emissions of CO are expected to be less than 260 tons per year (combustion turbine and duct burner).

#### **Volatile Organic Compound (VOC) Control**

Volatile organic compound (VOC) emissions, like CO emissions, are formed due to incomplete combustion of fuel. There are no viable add-on control techniques as the combustion turbine itself is very efficient at destroying VOC. The applicant has proposed good combustion practices to control VOC for both the turbine and the duct burner. The CT proposed limit is 1.4 ppm. According to GE, even lower VOC emissions were achieved during recent tests of the DLN-2.6 technology when firing natural gas.<sup>4</sup> VOC concentrations will be less than 8 ppm for simultaneous operation of the combustion turbine and duct burner.

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**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**Particulate Matter (PM/PM<sub>10</sub>) Control**

Particulate matter is generated by various physical and chemical processes during combustion and will be affected by the design and operation of the NO<sub>x</sub> controls. The particulate matter emitted from this unit will mainly be less than 10 microns in diameter (PM<sub>10</sub>).

Natural gas will be the only fuels fired and is efficiently combusted in gas turbines. Clean fuels are necessary to avoid damaging turbine blades and other components already exposed to very high temperature and pressure. Natural gas is an inherently clean fuel and contains no ash.

A technology review indicated that the top control option for PM<sub>10</sub> is a combination of good combustion practices, fuel quality, and filtration of inlet air. This has been chosen as BACT by the applicant, the Department concurs. Annual emissions of PM/PM<sub>10</sub> are expected to be less than 55 tons per year (combustion turbine and duct burner).

Drift eliminators shall be installed on the cooling tower to reduce PM/PM<sub>10</sub>. The drift eliminators shall be designed and maintained to reduce drift to 0.002 percent of the circulating water flow rate. No PM testing is required.

**BACKGROUND ON SELECTED GAS TURBINE AND DUCT BURNER**

SERL plans to purchase a 167 MW (nominal) General Electric 7FA combined cycle gas turbine with a supplementary-fired heat recovery steam generator (HRSG) equipped with a duct burner and a steam turbine-electrical generator to produce an additional 74 MW (nominal) of electrical power and process steam.

The 585 mmBtu/hr duct burner will be manufactured by Coen or equivalent and will be a low NO<sub>x</sub> design. For reference, the heat rate of a combustion turbine with a 600 mmBtu/hr supplementary-fired duct burner used to make only electrical power is 4,350 Btu/KW-hr.<sup>5</sup> In cogeneration mode, if only 50 percent of the process steam generated is considered, the heat rate is even lower. This compares with the presumed heat rate of 10,667 Btu/KW-hr in the recently revised NSPS Subpart Da.<sup>6</sup>

The first commercial GE 7F Class unit was installed at the Virginia Power Chesterfield Station in 1990.<sup>7</sup> The initial units had a firing temperature of 2300 °F and a combined cycle efficiency exceeding 50 percent. By the mid-90s, the line was improved by higher combustor pressure, a firing temperature of 2400 °F, and a combined cycle efficiency of approximately 56 percent based on a 167 MW combustion turbine. The line was redesignated as the 7FA Class.

The first GE 7F/FA project in Florida was at the FPL Martin Plant in 1993 and entered commercial service in 1994.<sup>8</sup> The units were equipped with DLN-2 combustors with a permitted NO<sub>x</sub> limit of 25 ppm. These actually achieve less than 25 ppm of NO<sub>x</sub> and 15 ppm of CO. The City of Tallahassee recently received approval to install a GE 7FA Class unit at its Purdom Plant.<sup>9</sup> Although permitted emissions are 12 ppm of NO<sub>x</sub>, the City obtained a performance guarantee from GE of 9 ppm.<sup>10</sup> FPL also obtained a guarantee of 9 ppm for six GE 7241FA turbines to be installed at the Fort Myers Repowering project. These limits were incorporated in the draft permit issued for the project.<sup>11</sup>

General Electric, other manufacturers, and their customers are relying on further advancement and refinement of DLN technology to provide sufficient NO<sub>x</sub> control for their combined cycle turbines in Florida. Where required by BACT determinations of certain states, General Electric incorporates SCR in combined cycle projects.<sup>12</sup>



**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

The approach of progressively refining such technology is a proven one, even on some relatively large units. Basically this was the strategy adopted in Florida throughout the 1990's. Recently GE Frame 7FA units met performance guarantees of 9 ppm with "DLN-2.6" burners at Fort St. Vrain, CO and Clark County, WA.<sup>13</sup> Although the permitted limit is 15 ppm, GE has already achieved emission levels of approximately 6 ppm on gas at a dual-fuel 7EA (120 MW combined cycle) unit at Cane Island Power Park in Kissimmee, FL.<sup>14</sup> The Cane Island unit is equipped with DLN-2 combustors. According to GE, similar performance is expected soon on the 7FA line and performance guarantees less than 9 ppm can be expected using the DLN-2.6 combustors for units delivered in a couple of years.<sup>15</sup>

The 9 ppm NO<sub>x</sub> limit on natural gas during baseload requested by SERL is typical compared with recent BACT determinations for F Class units, such as those previously listed.

The GE Speedtronic™ Mark V Gas Control System will be used. This control system is designed to fulfill all gas turbine control requirements. These include control of liquid, gas, or both fuels in accordance with the requirements of the speed, load control under part-load conditions, temperature control under maximum capability conditions, or during start-up conditions. Since emissions are controlled utilizing dry low NO<sub>x</sub> techniques, fuel staging and combustion mode are also controlled by the Mark V Control System, which also monitors the process. Sequencing of the auxiliaries to allow fully automated start-up, shutdown and cool-down are also handled by the Mark V Control System.<sup>16</sup>

**DEPARTMENT BACT DETERMINATION**

Following are the BACT limits determined for the SERL project assuming full load. Values for NO<sub>x</sub> are corrected to 15% O<sub>2</sub>. The emission limits or their equivalents in terms of pounds per hour and NSPS units, as well as the applicable averaging times, are given in the permit Specific Conditions No. 20 and 21.

POLLUTANT	CONTROL TECHNOLOGY	PROPOSED BACT LIMIT
PM/PM <sub>10</sub> , VE	Pipeline Natural Gas Good Combustion	10 Percent Opacity
VOC	As Above	1.4 ppm (CT on, DB off) 8 ppm (CT and DB on)
CO	As Above	9 ppm (CT on, DB off) 24 ppm (CT and DB on)
NO <sub>x</sub> (CT on, DB off)	DLN or SCR	9 ppm or 6 ppm
NO <sub>x</sub> (CT and DB on)	DLN and Low NO <sub>x</sub> , or SNCR, or SCR	9.8 ppm, or 6 ppm, or 6 ppm DB limited to 0.4 lb/MW-hr

**RATIONALE FOR DEPARTMENT'S DETERMINATION**

- SERL can obtain a guarantee from GE for DLN-2.6 combustors which have been demonstrated to meet all of the above limits on 7FA Class gas turbine with the duct burner off.
- The turbine emission limits with the duct burner off comply with the NSPS and are less than or equal to recent Department BACT determinations applicable to new units at start-up.
- VOC emissions of 1.4 ppm from the combustion turbine proposed by SERL are at the lower end of values determined as BACT. Good Combustion is sufficient to achieve these low levels

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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with the DLN-2.6 combustors while firing natural gas. The limit of 8 ppm with the duct burner on is also quite low.

- The duct burner used for supplementary firing will comply with the NSPS (Subpart Da). It will cause slightly higher NO<sub>x</sub> concentrations than permitted for the combustion turbine alone.
- If a different combustion turbine is selected or if the NO<sub>x</sub> limits cannot be met with Low NO<sub>x</sub> technology with the duct burner on, SERL must install either SNCR or SCR technology and meet correspondingly lower emission limits achievable by the latter technologies.
- The levelized costs of NO<sub>x</sub> reduction to 3.5 - 6 ppm by conventional SCR installed in the HRSG were estimated by SERL as \$4,660 - 5,247 per ton of NO<sub>x</sub> removed after initial control by DLN to 9 ppm. The Department's estimates the levelized costs at \$2,500 per ton of NO<sub>x</sub> removed starting with DLN combustion control to 25 ppm. This figure does not reflect a possible credit for savings by purchasing the less expensive line of combustors such as the GE DLN-1 or DLN-2 in lieu of the DLN 2.6 combustors. Neither the Department nor the SERL estimates reflect the cost-effectiveness of duct burner-generated NO<sub>x</sub> removal.
- If the combined unit can meet applicable limits by DLN with the duct burner off but not with the duct burner on, SNCR can be utilized when the duct burner is on. SNCR is less expensive and more cost-effective than SCR. It can be turned off when the duct burner is off since the proper operating temperature range will not exist under that mode.
- SCR and SNCR cause environmental and energy impacts including increased particulate emissions, undesirable (though unregulated) ammonia emissions, and energy penalties. At equal emission rates, DLN technology is a better control strategy than SCR or SNCR. At higher emission rates, DLN can still be justified as BACT given the negative effects of SCR described above. Accordingly, the Department has set a range of emission limits and control methods based on the turbine and duct burner combustion technologies chosen by SREL.
- The Department's overall BACT determination is equivalent to approximately 0.16 lb/MW-hr by DLN/Low NO<sub>x</sub> or 0.10 lb/MW-hr by SCR or SNCR. For reference, NSPS promulgated on September 3, 1998 requires that new Da units meet a limit of 1.6 lb/MW-hr.
- The Department considers a limit of 9.8 ppm (DLN and Low NO<sub>x</sub>) or 6 ppm (SCR or SNCR) as BACT for this cogeneration facility. In addition the contribution of the duct burner to overall emissions cannot exceed 0.4 lb/MW-hr.
- The CO concentrations of 9 ppm are very low with the duct burner off. With the duct burner on, they will be less than 24 ppm which is within the range of recent Department BACT determinations for combustion turbines alone. The Department will set CO limits achievable by good combustion equal to 9 ppm for the combustion turbine and 24 ppm when the duct burner is on. For reference, CO limits for the Lakeland and Tallahassee projects are 25 ppm on gas while the limit for the FPL Fort Myers project is 12 ppm. The CO impact on ambient air quality is lower compared to other pollutants because the allowable concentrations of CO are much greater than for NO<sub>x</sub>, SO<sub>2</sub>, VOC (ozone) or PM<sub>10</sub>.
- SREL evaluated the use of an oxidation catalyst designed for 85 percent reduction and having a three year catalyst life. The oxidation catalyst control system was estimated by SREL to increase

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

the total capital cost of the project by \$1,462,846, with an annualized cost of \$548,257 per year. SREL estimated levelized costs for CO catalyst control at about \$2,481 per ton to control CO emissions to 39 TPY (from 260 TPY).

- The VOC emission concentration of 1.4 ppm proposed by SREL is at the lower end of values determined as BACT for the combustion turbine alone. Good Combustion is sufficient to achieve these low levels. With the duct burner on, the levels are still relatively low except at very high operating rates.
- BACT for PM<sub>10</sub> was determined to be good combustion practices consisting of: inlet air filtering; use of pipeline natural gas; and operation of the unit in accordance with the manufacturer-provided manuals.
- PM<sub>10</sub> emissions will be very low and difficult to measure. Therefore, the Department will set a Visible Emission standard of 10 percent opacity consistent with the definition of BACT. Examples of installations with similar VE limits include the City of Lakeland, the City of Tallahassee, and the FPL Fort Myers projects in Florida as well as the Barry, Alabama project.

**COMPLIANCE PROCEDURES**

<b>POLLUTANT</b>	<b>COMPLIANCE PROCEDURE</b>
Visible Emissions	Method 9
Volatile Organic Compounds	Method 18, 25, or 25A (initial tests only)
Carbon Monoxide	Annual Method 10 (can use RATA if at capacity)
NO <sub>x</sub> (3 and 24-hr averages)	NO <sub>x</sub> CEMS, O <sub>2</sub> or CO <sub>2</sub> diluent monitor, and flow device as needed
NO <sub>x</sub> (performance)	Annual Method 20 (can use RATA if at capacity)

**BACT EXCESS EMISSIONS APPROVAL**

Pursuant to the Rule 62-210.700 F.A.C., the Department through this BACT determination will allow excess emissions as follows: Valid hourly emission rates shall not include periods of startup, shutdown, or malfunction as defined in Rule 62-210.200 F.A.C., where emissions exceed the applicable NO<sub>x</sub> standard. These excess emissions periods shall be reported as required in Specific Condition 29 of the Permit. A valid hourly emission rate shall be calculated for each hour in which at least two NO<sub>x</sub> concentrations are obtained at least 15 minutes apart [Rules 62-4.070 F.A.C., 62-210.700 F.A.C and applicant request ].

Excess emissions may occur under the following startup scenarios:

Hot Start: For 1 hour following a shutdown less than or equal to 8 hours.

Warm Start: For 2 hours following a shutdown between 8 and 48 hours.

Cold Start: For 4 hours following a shutdown greater than or equal to 48 hours.

The *starts* are defined by the amount of time the unit has been shutdown, following the normal (hot) shutdown procedure described by General Electric, prior to the startup.<sup>17</sup>

**APPENDIX BD**  
**BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

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**DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:**

A. A. Linero, P.E. Administrator, New Source Review Section  
Teresa Heron, Review Engineer, New Source Review Section  
Department of Environmental Protection  
Bureau of Air Regulation  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Recommended By:

Approved By:

\_\_\_\_\_  
C. H. Fancy, P.E., Chief  
Bureau of Air Regulation

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Howard L. Rhodes, Director  
Division of Air Resources Management

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Date:

**References**

- <sup>1</sup> Report. EPA. "Summary Report - Control of NO<sub>x</sub> Emissions by Reburning." Document EPA/625/R-96/001. February, 1996.
- <sup>2</sup> Letter. Harper, J. A., EPA Region IV to Fancy, C., Florida DEP. June 3, 1994. Construction Permit Amendment for Orlando Cogen Limited, L.P.
- <sup>3</sup> Verbal Communication. Harley, M., Florida DEP, and Linero, A. A., Florida DEP. September 18, 1998. Custom Fuel Monitoring and NSPS Da and Db Applicability.
- <sup>4</sup> Telecon. Vandervort, C., GE, and Linero, A. A., DEP. "VOC Emissions from FA Gas Turbines with DLN-2.6 Combustors."
- <sup>5</sup> Fisk, R.W. and VanHousen, R.L., GE. "Cogeneration Application Considerations." 1996.
- <sup>6</sup> Report. EPA. "New Source Performance Standards, Subparts Da and Db - Summary of Public Comments and Responses." Document EPA-453/R-98-005
- <sup>7</sup> Brochure. General Electric. "GE Gas Turbines - MS7001FA." Circa 1993.
- <sup>8</sup> Davis, L.B., GE. "Dry Low NO<sub>x</sub> Combustion Systems for GE Heavy Duty Gas Turbines." 1994.
- <sup>9</sup> Florida DEP. PSD Permit, City of Tallahassee Purdom Unit 8. May, 1998.
- <sup>10</sup> City of Tallahassee. PSD/Site Certification Application. April, 1997.
- <sup>11</sup> Florida DEP. Intent to Issue Permit. FPL Fort Myers Repowering Project. September, 1998.
- <sup>12</sup> State of Alabama. PSD Permit, Alabama Power/Barry Sithe/IPP (GE 7FA).
- <sup>13</sup> Telecon. Schorr, M., GE, and Costello, M., Florida DEP. March 31, 1998. Status of DLN-2.6 Program
- <sup>14</sup> Florida DEP. Bureau of Air Regulation Monthly Report. June, 1998.
- <sup>15</sup> Telecon. Schorr, M., GE, and Linero, A. A., Florida DEP. August, 1998. Cost effectiveness of DLN versus SCR.
- <sup>16</sup> Rowen, W.I. "General Electric Speedtronic™ Mark V Gas Turbine Control System. 1994."
- <sup>17</sup> General Electric. Combined Cycle Startup Curves. June 19, 1998.

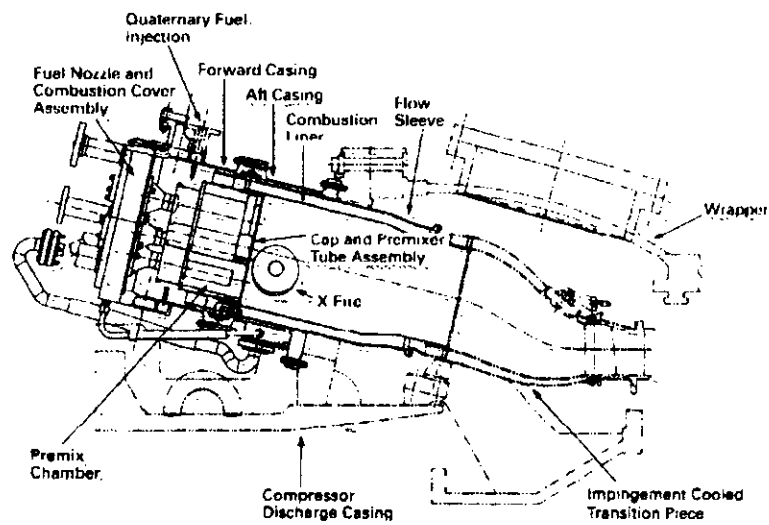
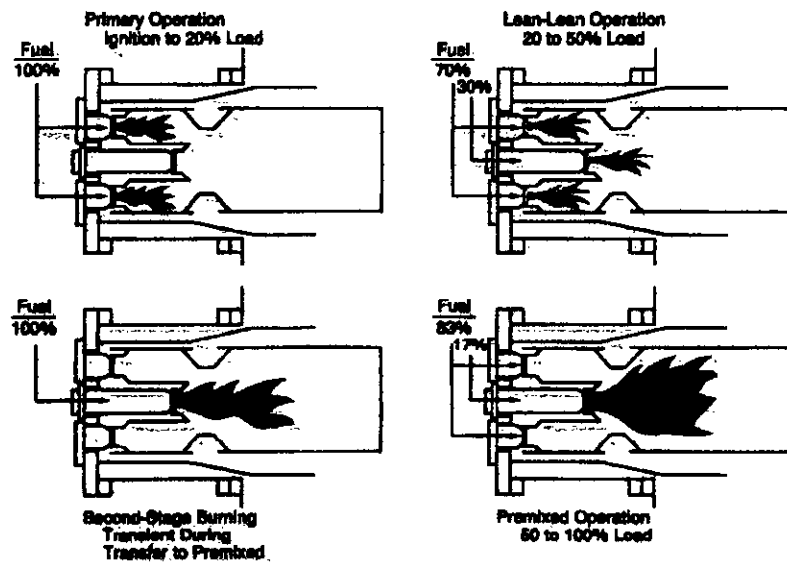


Figure 1 - Dry Low NOX Operating Modes - DLN-1

.Cross Section of DLN-2.0

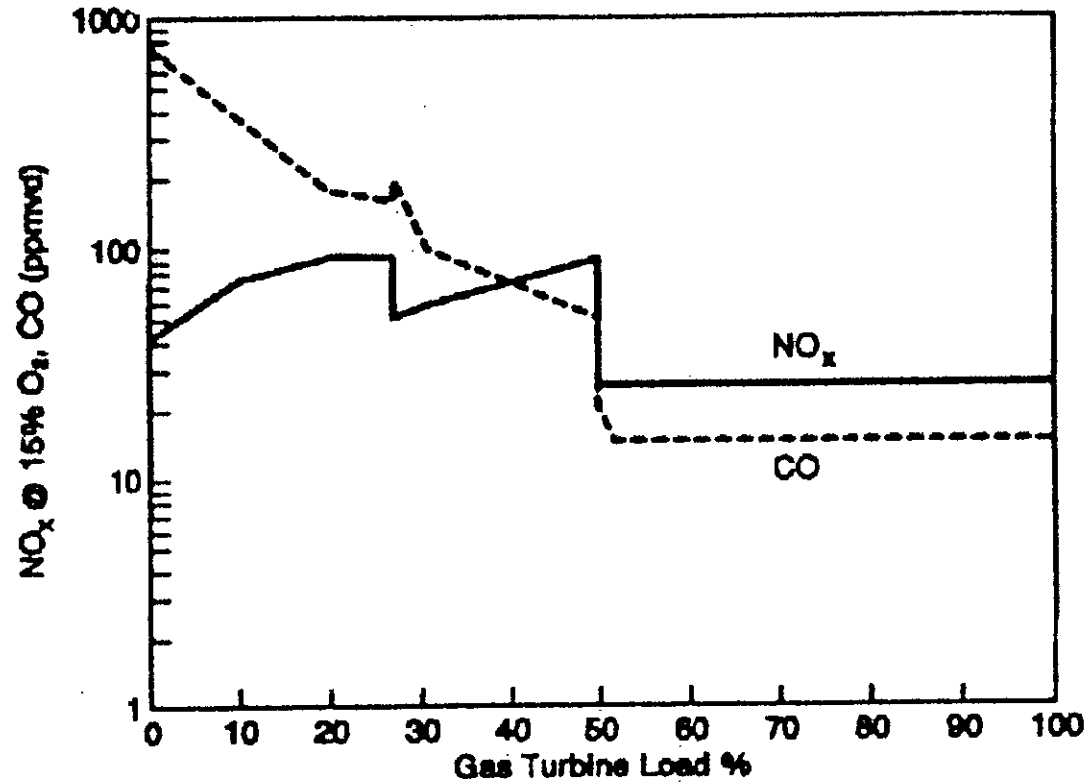


Figure 2 - Emissions Performance Curves for GE DLN-2 Combustors

Firing Natural Gas in a Dual Fuel GE 7FA Combustion Turbine

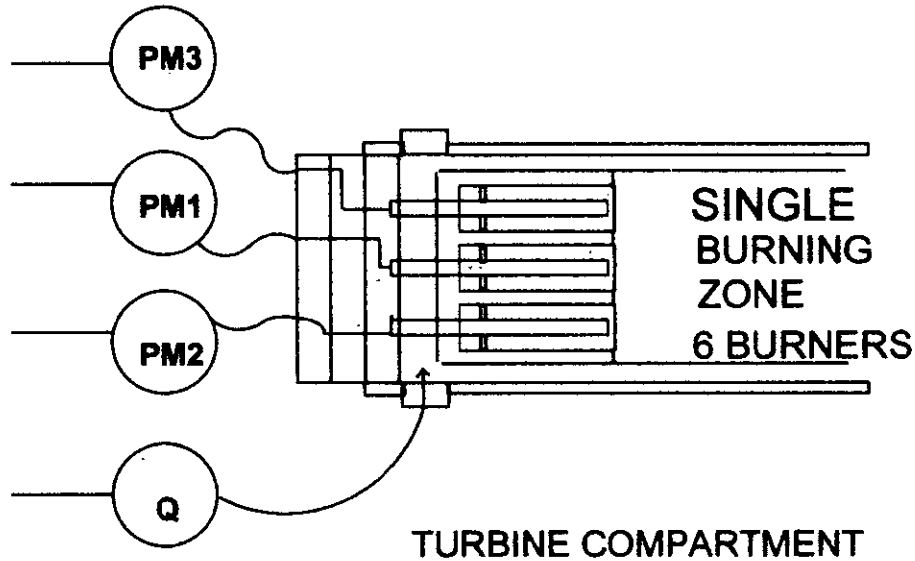
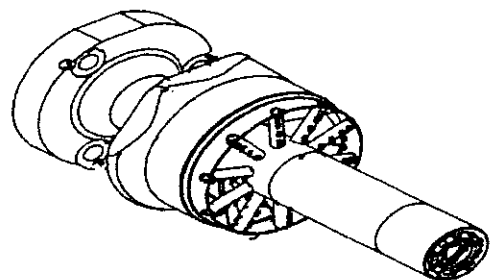
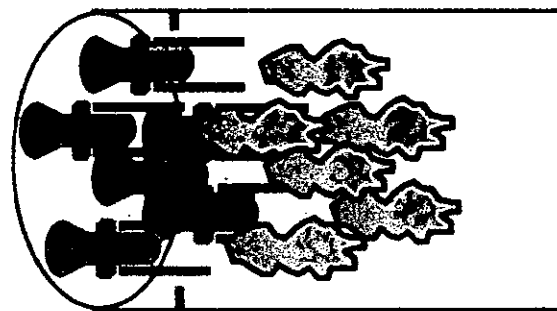
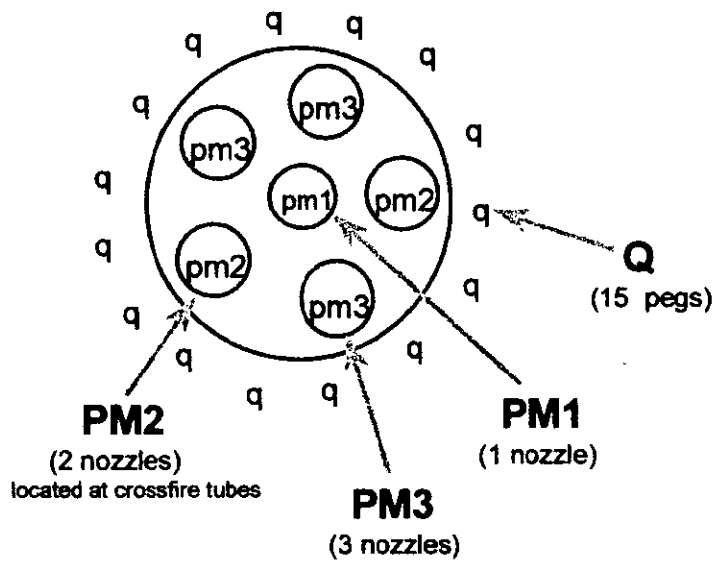


Figure 3 - GE DLN-2.6 Combustor and Nozzle Arrangement

## Gas Turbine - Hot Gas Path Parts

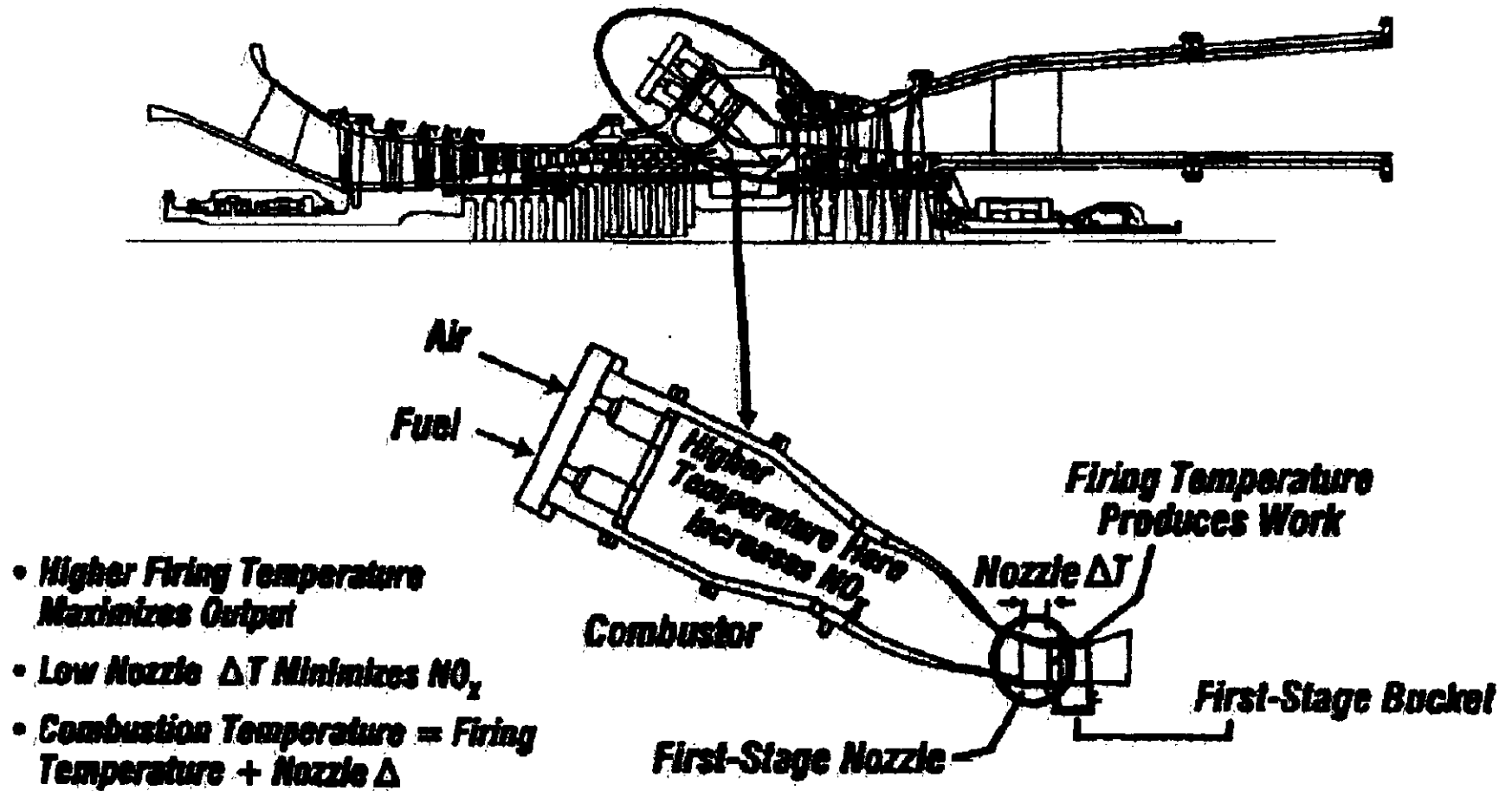
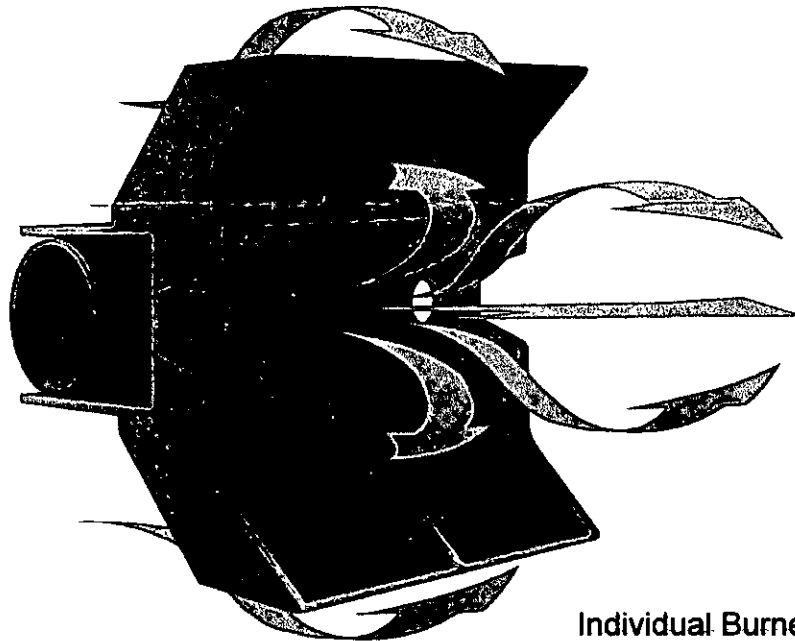
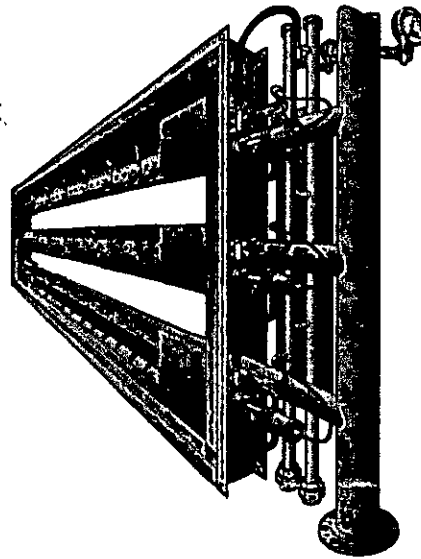


Figure 4 - Relation Between Flame Temperature and Firing Temperature



Burner Arrangement



Individual Burner

Figure 5 - Coen In-Line Gas-Fired Duct Burner

APPENDIX GC  
GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]

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- G.1 The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.
- G.2 This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings or exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.
- G.3 As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey and vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.
- G.4 This permit conveys no title to land or water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.
- G.5 This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
- G.6 The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.
- G.7 The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:
- a) Have access to and copy and records that must be kept under the conditions of the permit;
  - b) Inspect the facility, equipment, practices, or operations regulated or required under this permit, and,
  - c) Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.
- Reasonable time may depend on the nature of the concern being investigated.
- G.8 If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:
- a) A description of and cause of non-compliance; and
  - b) The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

**APPENDIX GC**  
**GENERAL PERMIT CONDITIONS [F.A.C. 62-4.160]**

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The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

- G.9 In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, Florida Statutes. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.
- G.10 The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.
- G.11 This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.
- G.12 This permit or a copy thereof shall be kept at the work site of the permitted activity.
- G.13 This permit also constitutes:
- a) Determination of Best Available Control Technology (X)
  - b) Determination of Prevention of Significant Deterioration (X); and
  - c) Compliance with New Source Performance Standards (X).
- G.14 The permittee shall comply with the following:
- a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
  - b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application or this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
  - c) Records of monitoring information shall include:
    - 1. The date, exact place, and time of sampling or measurements;
    - 2. The person responsible for performing the sampling or measurements;
    - 3. The dates analyses were performed;
    - 4. The person responsible for performing the analyses;
    - 5. The analytical techniques or methods used; and
    - 6. The results of such analyses.
- G.15 When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.



# Department of Environmental Protection

Lawton Chiles  
Governor

Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Virginia B. Wetherell  
Secretary

## P.E. Certification Statement

**Permittee:**

**DEP File No. 1130168-001-AC**

Santa Rosa Energy LLC  
Santa Rosa Energy Center  
Santa Rosa County

**Project type:**

Project to install a nominal 241 megawatt (MW) combined cycle cogeneration unit at the Stirling Fibers Facility, Pace, Santa Rosa County. The unit is a nominal 167 MW General Electric MS7241FA gas-fired combustion turbine-generator with a supplementary-fired heat recovery steam generator (HRSG) that will raise sufficient steam to produce another 74 MW via a steam-driven electrical generators and provide process steam to Stirling Fibers. The project also includes: a 585 mmBtu/hr in-line gas-fired duct burner; a cooling tower; and a 200 foot stack.

Nitrogen Oxides emissions will be controlled by Dry Low NO<sub>x</sub> (DLN-2.6) combustors capable of achieving emissions of 9 parts per million (ppm) by volume at 15 percent oxygen, 9 ppm of CO, and 1.4 ppm of VOC. Low NO<sub>x</sub> burners in the in-line duct burner arrangement will operate such that NO<sub>x</sub> emissions concentrations from the combined unit will also meet a limit of 9.8 ppm @ 15% O<sub>2</sub>. The duct burner may not contribute more than 0.4 lb/MW-hr gross output. Combined emissions of carbon monoxide will be controlled to 24 ppm, while emissions of volatile organic compounds will be less than 8 ppm. Emissions of sulfur dioxide, sulfuric acid mist, and particulate matter will be very low because of the switch to inherently clean pipeline quality natural gas. These limits meet Best Available Control Technology (BACT). If the limits are not attainable by equipment actually selected by the applicant, correspondingly lower limits must be achieved by selective catalytic reduction (SCR) or selective non-catalytic reduction (SNCR).

Impacts due to the proposed project emissions are all below the applicable significant impact limits corresponding to the nearest PSD Class I (Breton, Bradwell Bay, and St. Marks National Wilderness Areas) and Class II areas.

***I HEREBY CERTIFY** that the engineering features described in the above referenced application and subject to the proposed permit conditions provide reasonable assurance of compliance with applicable provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-4 and 62-204 through 62-297. However, I have not evaluated and I do not certify aspects of the proposal outside of my area of expertise (including but not limited to the electrical, mechanical, structural, hydrological, and geological features).*

A. A. Linero, P.E.  
Registration Number: 26032

10/9/99  
Date

Bureau of Air Regulation  
New Source Review Section  
111 South Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Phone (850) 921-9523  
Fax (850) 922-6979

10/9

"Protect, Conserve and Manage Florida's Environment and Natural Resources"

ATL GA 303 10/13/98 20:08

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**SENDER:**

- Complete items 1 and/or 2 for additional services.
- Complete items 3, 4a, and 4b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

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- 1.  Addressee's Address
- 2.  Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:  
 Mr. Doug Neelley  
 Air, Radiation Tech Branch  
 U S EPA - Region IV  
 61 Forsyth St.  
 Atlanta, GA 30303

4a. Article Number  
 Z 333 612 528

4b. Service Type  
 Registered  Certified  
 Express Mail  Insured  
 Return Receipt for Merchandise  COD

7. Date of Delivery  
 10-13-98

5. Received By: (Print Name)  
 Alan Lindsey

8. Addressee's Address (Only if requested and fee is paid)

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**Receipt for Certified Mail**  
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 Do not use for International Mail (See reverse)

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Street & Number <u>EPA</u>	
Post Office, State, & ZIP Code <u>Atlanta, GA</u>	
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$
Postmark or Date <u>1130168-001-A2 10-9-98</u> <u>P50-F1-253</u>	

PS Form 3800, April 1995