



Jeb Bush  
Governor

Best Available Copy  
Department of  
Environmental Protection

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

David B. Struhs  
Secretary

December 28, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Wade Smith  
General Manager  
Orange Cogeneration Limited Partnership  
1125 US Highway 98 South  
Suite 100  
Lakeland, Florida 33801

Re: DEP File No. 1050231-005-AC; Modification of Permit No. PSD-FL-206C  
Orange Cogeneration / Polk County

The applicant, Orange Cogeneration Limited Partnership (OCLP), applied on October 25, 1999, to the Department for a modification to air construction permit number PSD-FL-206C for its Orange Cogeneration Facility located in Polk County. The request is to allow the facility to install NO<sub>x</sub> control equipment on Emission Units 001 and 002, GE LM 6000 DLE units configured for combined cycle operation. The specific equipment requested will allow SPRINT™ and selective water injection to be installed in addition to the Dry Low Emissions equipment. The Department has reviewed the modification request. The referenced permit is hereby modified as follows:

**Specific Condition 8 and Table 1 (note e):** Each CT shall have a maximum heat input (LHV) of 368.3 MMBtu/hr, which is approximately 389,300 CFH of natural gas, when using dry low NO<sub>x</sub> and/or wet injection technologies technology to control NO<sub>x</sub> emissions.

**Specific Condition 10:** Prior to ~~September 1, 2000~~ January 1, 2001, the maximum NO<sub>x</sub> concentration, 1 hour average, from each CT/HRSG unit shall not exceed 25 parts per million by volume dry corrected to 15 percent oxygen at ISO standard ambient conditions (ppmvd @ 15% O<sub>2</sub> at ISO conditions), as determined by the procedures in Specific Conditions No. 16, 17 and 18.

**Specific Condition 11 and Table 1 (note d):** After ~~December 31, 1999~~ August 31, 2001, the maximum NO<sub>x</sub> concentration, + 24-hour block average, from each CT/HRSG unit shall not exceed 15 ppmvd @ 15% O<sub>2</sub> at ISO conditions as determined by the procedure in Specific Condition Nos. 16, 17 and 18. No further extensions of this permit shall be granted for the purpose of achieving the targeted 15 ppmvd NO<sub>x</sub> emissions, with the exception of a reasonable time required to install SCR. The permittee shall obtain prior approval from the Department for any air pollution control equipment not addressed in this permit that is needed to meet the NO<sub>x</sub> emission standard. The Department may revise the limit based upon the capabilities of alternative equipment installed.

**Specific Condition 19:** Prior to ~~January 1, 1998~~ September 1, 2000, the permittee shall provide a report showing how the allowable NO<sub>x</sub> emissions of 15 ppmvd @ 15% O<sub>2</sub> ISO conditions is achieved by the CTs.

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permit modification is issued pursuant to Chapter 403, Florida Statutes.

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

Any party to this order (permit modification) has the right to seek judicial review of under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #353900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed with thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

*for* HL Rhodes  
Howard L. Rhodes, Director  
Division of Air Resources  
Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this permit modification was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on 12-28-99 to the person(s) listed:

Wade Smith, Orange Cogeneration LP \*  
Doug Neely, EPA  
John Bunyak, NPS  
Bill Proses, DEP-SWD  
Mr. Gregg Worley, EPA

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.

Kim Jones  
(Clerk)

12-28-99  
(Date)

## **FINAL DETERMINATION**

Orange Cogeneration Limited Partnership  
Orange Cogeneration Facility  
DEP File No. 1050231-005-AC, PSD-FL-206C

The Department distributed a public notice package on November 23, 1999 to allow the applicant to modify its permit at the Orange Cogeneration Facility located in Polk County. The Public Notice of Intent to Issue was published in the Polk County Democrat on November 25, 1999.

### **COMMENTS/CHANGES**

No comments were received by the Department from the public.

Neither the EPA nor the National Park Service had adverse comments.

No comments were received from the applicant.

### **CONCLUSION**

The final action of the Department is to issue the permit without changes.

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
NOTICE OF FINAL PERMIT

In the Matter of an  
Application for Permit by:

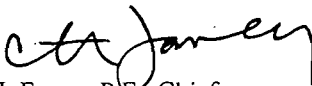
Orange Cogeneration Limited Partnership  
1125 U.S. 98 South  
Suite 100  
Lakeland, Florida 33801

DEP File No.1050231-005-AC, PSD-FL-206C  
Orange Cogeneration Facility  
Polk County

Enclosed is Final Permit Number 1050231-005-AC. This permit authorizes Orange Cogeneration Limited Partnership to install wet technologies on the Orange Cogeneration Facility's Units 1 and 2 in an effort to reduce the NO<sub>x</sub> emission rate to 15 ppmvd while firing natural gas or biogas. This permit is issued pursuant to Chapter 403, Florida Statutes.

Any party to this order has the right to seek judicial review of it under section 120.68 of the Florida Statutes, by filing a notice of appeal under rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

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

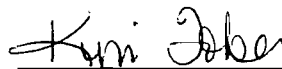
CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this Notice of Final Permit (including the Final permit) was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on 12-28-99 to the person(s) listed:

Wade Smith, Orange Cogeneration \*  
Gregg Worley, EPA  
Doug Neeley, EPA  
John Bunyak, NPS  
Bill Proses, DEP-SWD

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)

12-28-99  
\_\_\_\_\_  
(Date)



RECEIVED

DEC 02 1999

BUREAU OF AIR REGULATION

December 1, 1999

Mr. A. A. Linero, P.E.  
Administrator  
New Source Review Section  
Florida Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400


Re: DEP File No. (PSD-FL-206C)  
Orange Cogeneration / Polk County

Dear Mr. Linero:

I have enclosed an affidavit from The Polk County Democrat showing that the PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT MODIFICATION for the Orange Cogeneration Facility located near Bartow, Florida was published in their paper on November 25, 1999.

If you have any questions please call me at 941-682-6338.

Sincerely,  
Orange Cogeneration Limited Partnership  
by Orange Cogeneration GP, Inc.  
its general partner

  
Allan Wade Smith  
General Manager

enclosure

cc: M. Halpen, BAR  
EPA  
NPS  
SWD

PUBLIC NOTICE OF INTENT  
TO ISSUE AIR CONSTRUCTION  
PERMIT  
MODIFICATION  
STATE OF FLORIDA  
DEPARTMENT OF  
ENVIRONMENTAL  
PROTECTION  
Orange Cogeneration  
Limited  
Partnership, Orange  
Cogeneration Facility  
DEP File No. PSD-FL-206C,  
1050231-005-AC  
Polk County

AFFIDAVIT OF PUBLICATION

The Polk County Democrat

Published Semi-Weekly  
Bartow, Polk County, Florida

Case No. \_\_\_\_\_

STATE OF FLORIDA  
COUNTY OF POLK

Before the undersigned authority personally appeared \_\_\_\_\_  
Mary G. Frisbie \_\_\_\_\_, who on oath says that (s)he is  
Treasurer of The Polk County Democrat, a newspaper  
published at Bartow, Polk County, Florida; that the attached copy of advertisement,  
being a Public Notice of Intent in the  
matter of Issue Air Construction Permit Modification  
#1050231-005-AC  
in the \_\_\_\_\_ Court, was published in said newspaper in the issues  
of Nov. 25, 1999.

Affiant further says that The Polk County Democrat is a newspaper published at  
Bartow, in said Polk County, Florida, and that said newspaper has heretofore been continu-  
ously published in said Polk County, Florida, each Monday and Thursday, and has been  
entered as second class matter at the post office in Bartow, in said Polk County, Florida, for a  
period of one year next preceeding 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  
advertisement for publication in said newspaper.

Signed Mary G. Frisbie

Sworn to and subscribed before me this 29th. day of Nov., 19 99,

by Mary G. Frisbie,

who is personally known to me.

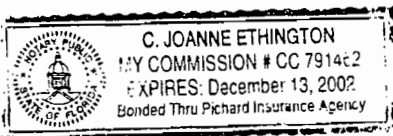
C. Joanne Ethington  
(Signature of Notary Public)

C. Joanne Ethington

(Printed or typed name of Notary Public)

Notary Public

My Commission Expires:



The Department of Environ-  
mental Protection  
(Department) gives notice of its  
intent to issue a modification of  
a Prevention of Significant  
Deterioration (PSD) Permit to  
Orange Cogeneration Limited  
Partnership (OCLP) for its  
Orange Cogeneration Facility  
located in Polk County. A Best  
Available Control Technology  
(BACT) determination was not  
required for this modification  
pursuant to Rule 62-212.400,  
F.A.C., Prevention of Signifi-  
cant Deterioration (PSD). The  
applicant's name and address  
are: Orange Cogeneration  
Limited Partnership, 1125 U.S.  
98 South, Suite 100, Lakeland,  
Florida 33801.

This is an existing facility  
consisting of two nominal 40  
Megawatt combined cycle  
combustion turbines (Units 1  
and 2). Both units fire natural  
gas and biogas with heat inputs  
of 368.3 MMBtu/hr each (at an  
ambient temperature of 47°F).  
These units have a Title V  
permit (1050231-001-AV)  
issued by the State of Florida.

The permitted emission rate  
of nitrogen oxides (NOx) for  
Units 1 and 2 while firing natu-  
ral gas or biogas is 25 ppm. On  
an annual basis the permitted  
tons per year (TPY) of potential  
NOx emissions are 168.6  
each. Effective January 1,  
2000 the permitted NOx emis-  
sion rate for each unit  
decreases to 15 ppm while  
firing natural gas or biogas  
firing, causing the potential  
TPY of Nox to equal to 101.2 (a  
reduction of 67.4 TPY for each  
unit).

OCLP requests that the  
aforementioned NOx emission  
rates for each unit remain at 25  
ppm, for a period of time  
adequate to allow for the instal-  
lations and testing of wet tech-  
nologies. OCLP has deter-  
mined that an extension of 20  
months (through August 2001)  
will allow adequate time for the  
units to be capable of achieving  
the lower (15 ppm) limits  
through the application of this  
technology. No other emission  
limit increases are requested.

It is noted that emissions  
from each unit have ranged  
from 52.5 to 61.1 tons per year  
of NOx over a 3-year period.  
This reflects the intermediate  
loading duty of these units. It is  
expected that each unit will  
typically operate in a similar  
manner in the future.

The Department will issue  
the final permit with the  
attached conditions unless a  
response received in accor-  
dance with the following proce-  
dures results in a different or  
significant change of terms or  
conditions.

The Department will accept written comments concerning the proposed permit issuance action for a period of 14 (fourteen) days from the date of publication of "Public Notice of Intent to Issue Air Construction Permit, Modification." Written comments should be provided

to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mall 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 modification 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 F.S. 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, Mall 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. Petitioners filed by any persons other than those entitled to written notice under Section 120.60(3) F.S. of the State of Florida, 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, 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 are or 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 A demand for relief.

A petition that does not dispute the material facts on 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 S. Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Telephone: 850/488-0114  
Fax: 850/922-6979

Department of Environmental Protection

Southwest District Office  
3804 Coconut Palm Drive  
Tampa, Florida 33619-8218  
Telephone: 813/744-6100  
Fax: 813/744-6084

The complete project file includes the Draft Permit modification, 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.

Nov. 25, 1999-3731

PUBLIC NOTICE OF INTENT  
TO ISSUE AIR CONSTRUCTION  
PERMIT  
MODIFICATION  
STATE OF FLORIDA  
DEPARTMENT OF  
ENVIRONMENTAL  
PROTECTION  
Orange Cogeneration  
Limited  
Partnership, Orange  
Cogeneration Facility  
DEP File No. PSD-FL-206C,  
1050231-005-AC  
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue a modification of a Prevention of Significant Deterioration (PSD) Permit to Orange Cogeneration Limited Partnership (OCLP) for its Orange Cogeneration Facility located in Polk County. A Best Available Control Technology (BACT) determination was not required for this modification pursuant to Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD). The applicant's name and address are: Orange Cogeneration Limited Partnership, 1125 U.S. 98 South, Suite 100, Lakeland, Florida 33801.

This is an existing facility consisting of two nominal 40 Megawatt combined cycle combustion turbines (Units 1 and 2). Both units fire natural gas and biogas with heat inputs of 368.3 MMBtu/hr each (at an ambient temperature of 47°F). These units have a Title V permit (1050231-001-AV) issued by the State of Florida.

The permitted emission rate of nitrogen oxides (NOx) for Units 1 and 2 while firing natural gas or biogas is 25 ppm. On an annual basis the permitted tons per year (TPY) of potential NOx emissions are 168.6 each. Effective January 1, 2000 the permitted NOx emission rate for each unit decreases to 15 ppm while firing natural gas or biogas firing, causing the potential TPY of NOx to equal to 101.2 (a reduction of 67.4 TPY for each unit).

OCLP requests that the aforementioned NOx emission rates for each unit remain at 25 ppm, for a period of time adequate to allow for the installations and testing of wet technologies. OCLP has determined that an extension of 20 months (through August 2001) will allow adequate time for the units to be capable of achieving the lower (15 ppm) limits through the application of this technology. No other emission limit increases are requested.

It is noted that emissions from each unit have ranged from 52.5 to 61.1 tons per year of NOx over a 3-year period. This reflects the intermediate loading duty of these units. It is expected that each unit will typically operate in a similar manner in the future.

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 or significant change of terms or conditions.

AFFIDAVIT OF PUBLICATION  
**The Polk County Democrat**

Published Semi-Weekly  
Bartow, Polk County, Florida

Case No. \_\_\_\_\_

STATE OF FLORIDA  
COUNTY OF POLK

Before the undersigned authority personally appeared \_\_\_\_\_  
Mary G. Frisbie, who on oath says that (s)he is  
Treasurer of The Polk County Democrat, a newspaper  
published at Bartow, Polk County, Florida; that the attached copy of advertisement,  
being a Public Notice of Intent in the  
matter of Issue Air Construction Permit Modification  
#1050231-005-AC  
in the \_\_\_\_\_ Court, was published in said newspaper in the issues  
of Nov. 25, 1999

Affiant further says that The Polk County Democrat is a newspaper published at Bartow, in said Polk County, Florida, and that said newspaper has heretofore been continuously published in said Polk County, Florida, each Monday and Thursday, and has been entered as second class matter at the post office in Bartow, in said Polk County, Florida, for a period of one year next preceeding the first publication of the attached copy of advertisement; 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 advertisement for publication in said newspaper.

Signed Mary G. Frisbie

Sworn to and subscribed before me this 29th. day of Nov., 19 99,

by Mary G. Frisbie,

who is personally known to me.

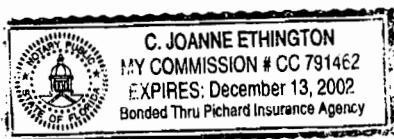
C. Joanne Ethington  
(Signature of Notary Public)

C. Joanne Ethington

(Printed or typed name of Notary Public)

Notary Public

My Commission Expires:





The Department will accept written comments concerning the proposed permit issuance action for a period of 14 (fourteen) days from the date of publication of "Public Notice of Intent to Issue Air Construction Permit Modification." 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 modification 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 F.S. 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. Petitioners filed by any persons other than those entitled to written notice under Section 120.60(3) F.S. of the State of Florida, 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, 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 are or 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 A demand for relief.

A petition that does not dispute the material facts on 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 S. Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Telephone: 850/488-0114  
Fax: 850/922-6979  
Department of Environmental Protection  
Southwest District Office  
3804 Coconut Palm Drive  
Tampa, Florida 33619-8218  
Telephone: 813/744-6100  
Fax: 813/744-6084

The complete project file includes the Draft Permit modification, 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.  
Nov. 25, 1999-3731

Z 031 391 913

US Postal Service  
**Receipt for Certified Mail**

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

Sent to		Wade Smith
Street & Number		Orange Cocon
Post Office, State & ZIP Code		Jacksonville FL
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	12-28-99	
1050231-005 AR PSD-FI-206C		

PS Form 3800, April 1995

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:

Wade Smith, Gen. Mgr  
Orange Cocon, LP  
1125 US 98 South  
Jacksonville, FL  
33801

4a. Article Number

Z 031 391 913

4b. Service Type

- Registered
- Express Mail
- Return Receipt for Merchandise
- Certified
- Insured
- COD

7. Date of Delivery

12/20/99

5. Received By: (Print Name)

6. Signature: (Addressee or Agent)

X [Signature]

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

Thank you for using Return Receipt Service.

Fold at line over top

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):

1.  Addressee's Address  
 2.  Restricted Delivery  
 Consult postmaster for fee.

3. Article Addressed to:  
 Mr. Wade Smith, Gen. Mgr.  
 Orange Cosen, LP  
 1125 US Hwy 98 S.  
 Lakeland, FL 33801

4a. Article Number  
 Z 333 618 201

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

7. Date of Delivery  
 7-22-99

5. Received By: (Print Name)

6. Signature: (Addressee or Agent)  
*[Signature]*

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

PS Form 3811, December 1994 102595-98-B-0229 Domestic Return Receipt

Thank you for using Return Receipt Service.

Z 333 618 201

US Postal Service  
**Receipt for Certified Mail**  
 No Insurance Coverage Provided.  
 Do not use for International Mail (See reverse)

Sent to	Wade Smith
Street & Number	Orange Cosen
Post Office, State & ZIP Code	Lakeland FL
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	7-20-99
	1050231

PS Form 3800, April 1995

Is your RETURN ADDRESS completed on the reverse side?

Attach 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.

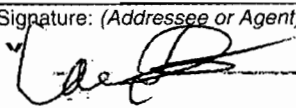
3. Article Addressed to:  
 Wade Smith, Gen. Mgr.  
 Orange Cozen  
 1125 US 98 South  
 Lakeland, FL 33801

4a. Article Number  
 Z 031 392 010

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

7. Date of Delivery  
 11-28-99

5. Received By: (Print Name)  
 \_\_\_\_\_

6. Signature: (Addressee or Agent)  


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

Thank you for using Return Receipt Service.

Z 031 392 010

US Postal Service  
**Receipt for Certified Mail**  
 No Insurance Coverage Provided.  
 Do not use for International Mail (See reverse)

Sent to		Wade Smith
Street & Number		Orange Cozen
Post Office, State, & ZIP Code		Lakeland FL
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		11-23-99
		PSO-FI-206C

PS Form 3800, April 1995

Return Receipt

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):

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

Consult postmaster for fee.

**3. Article Addressed to:**

Mr. Allan Wade Smith  
 General Manager  
 Orange Cogeneration L.P., Inc.  
 1125 US Highway 98 S., Suite 100  
 Lakeland, FL 33801

**4a. Article Number**

P 265 659 430

**4b. Service Type**

- Registered  Certified
- Express Mail  Insured
- Return Receipt for Merchandise  COD

**7. Date of Delivery**

3-8-99

**5. Received By: (Print Name)**

**6. Signature: (Addressee or Agent)**

*[Handwritten Signature]*

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

Thank you for using Return Receipt Service.

PS Form 3811, December 1994

102595-97-B-0179

Domestic Return Receipt

Post-it® Fax Note	7671	Date	7-7-94	# of pages	2
To	Darryl Graziani	From	Jeff Koerner		
Co./Dept.	Air Pollution	Co.	DEP		
Phone #	SC 273-3136	Phone #	SC 894-7268		
Fax #	561-355-2442	Fax #	850/922-6979		

P 265 659 430

US Postal Service

**Receipt for Certified Mail**

No Insurance Coverage Provided.

Do not use for International Mail (See reverse)

Sent to	
Mr. Allan Wade Smith, Orange	
Street & Number	
1125 US Hwy 98 S, Ste 100 Cogen	
Post Office, State, & ZIP Code	
Lakeland, FL 33801	
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	
Mailed: 3-4-99	

PS Form 3800 April 1995

Z 333 612 577

US Postal Service

### Receipt for Certified Mail

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

Sent to	Allan Smith	
Street & Number	Orange Cogen	
Post Office, State, & ZIP Code	Lakeland FL	
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	1050231-003-AC 12-22-98 PSD-FI-206C	

PS Form 3800, April 1995

Fold at line over top of envelope to

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. Allan Wade Smith  
Orange Cogen, CP  
1125 US Hwy 98 South  
Lakeland, FL 33801

4a. Article Number  
Z 333 612 577

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  
12-28-98

5. Received By: (Print Name)

Signature: (Addressee or Agent)

X

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

Thank you for using Return Receipt Service.

AFFIDAVIT OF PUBLICATION

The Polk County Democrat

Published Semi-Weekly
Bartow, Polk County, Florida

Case No. \_\_\_\_\_

STATE OF FLORIDA
COUNTY OF POLK

Before the undersigned authority personally appeared
Mary G. Frisbie, who on oath says that (s)he is
Treasurer of The Polk County Democrat, a newspaper
published at Bartow, Polk County, Florida; that the attached copy of advertisement,
being a Public Notice in the
matter of Intent to Issue Air Construction and Title V
Permit Modifications-
in the Court, was published in said newspaper in the issues
of Nov. 9, 1998

Affiant further says that The Polk County Democrat is a newspaper published at
Bartow, in said Polk County, Florida, and that said newspaper has heretofore been continu-
ously published in said Polk County, Florida, each Monday and Thursday, and has been
entered as second class matter at the post office in Bartow, in said Polk County, Florida, for a
period of one year next preceeding 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
advertisement for publication in said newspaper.

Signed Mary G. Frisbie

Sworn to and subscribed before me this 11th day of Nov., 19 98,

by Mary G. Frisbie

who is personally known to me.

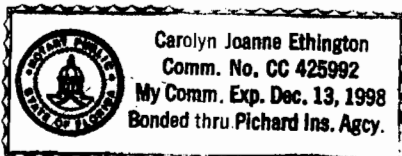
C. Joanne Ethington
(Signature of Notary Public)

C. Joanne Ethington

(Printed or typed name of Notary Public)

Notary Public

My Commission Expires:



PUBLIC NOTICE OF INTENT
TO ISSUE AIR CONSTRUCTION
AND TITLE V PERMIT
MODIFICATIONS

STATE OF FLORIDA
DEPARTMENT OF ENVIRON-
MENTAL PROTECTION
DEP File Nos.
1050231-003-AC and
1050231-004-AV,
PSD-FL-206C
Orange Cogeneration Facility
Polk County

The Department of Environ-
mental Protection
(Department) gives notice of its
intent to issue air construction
and Title V permit modifications
to Orange Cogeneration for its
facility located in Bartow, Polk
County. This permitting action
will also ultimately revise Title V
permit number
1050231-001-AV. A Best Avail-
able Control Technology
(BACT) determination was not
required for this modification
pursuant to Rule 62-212.400,
F.A.C. and 40 CFR 52.21,
Prevention of Significant Deter-
ioration (PSD). The applicant's
name and address are: Orange
Cogeneration GP, Inc. 1125
US Highway 98 South, Suite
100, Lakeland, Florida 33801.

This existing facility consists
of two 41 megawatt General
Electric LM6000PB gas-fired
combustion turbines with heat
recovery steam generators and
an auxiliary boiler. The applic-
able nitrogen oxides (NOx)
emission limit is 25 parts per
million (ppm). By January 1999
the combustion turbines must
comply with a limit of 15 ppm.
The applicant has requested
and extension until January 1,
2000 to meet the lower limit
using Dry Low NOx technology
(DLN). This will allow General
Electric additional time to incor-
porate design changes based
on recent testing conducted in
Ohio and Florida. A similar
developmental program by
General Electric resulted in
emissions well below 15 ppm
by DLN from its larger 7EA gas
combustion turbines at Cane
Island, Mulberry and
Gainesville.

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

The Department will accept
written comments concerning
the proposed permit issuance
action for a period of 30 (thirty)
days from the date of publica-
tion of "Public Notice of Intent to
Issue Air Construction and Title
V Permit Modifications." Writ-
ten 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 modifications and require, if applicable, another Public Notice.

The Department will issue these permit modifications 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 under section 120.60(3) of 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 the applicant at the appropriate time period shall constitute a waiver of that person's right to request an administrative determination (hearing) under sections 120.269 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 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

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 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:

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

Dept. of Environmental Protection  
Southwest District Office  
3804 Coconut Palm Drive  
Tampa, Florida 33619-8218  
Telephone: 813/744-6100  
Fax: 813/744-6084

Polk County Public Works Dept.  
Natural Resources & Drainage Div.

4189 Ben Durrance Road  
Bartow, Florida 33830  
Telephone: 941/534-7377  
Fax: 941/534-7374

The complete project file includes the Draft Permit modifications, 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.  
Nov. 9, 1998-3343



Z 333 612 492

US Postal Service  
**Receipt for Certified Mail**

No Insurance Coverage Provided.

Do not use for International Mail (See reverse)

PS Form 3800, April 1995

Sent to <i>Allan Smith</i>	
Street & Number <i>Orange Cogen</i>	
Post Office, State, & ZIP Code <i>Cape Coral, FL</i>	
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 <i>1050231-003-AC 11-5-98</i> <i>PSD-FL-206C</i>	

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:  
*Allan W. Smith, Gen Mgr*  
*Orange Cogen*  
*1125 US Hwy 98 S.*  
*Cape Coral, FL 33801*

4a. Article Number  
*2 333 612 492*

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

7. Date of Delivery  
*11-9-98*

5. Received By: (Print Name)

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

6. Signature: (Addressee or Agent)  
*X Janet Unpublished*

Thank you for using Return Receipt Service.

Fold at line over top of envelope to the right of the return address

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):

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

Consult postmaster for fee.

3. Article Addressed to:  
 Mr. Allan Smith  
 Orange Cogen  
 1125 US Hwy 98 South  
 Suite 100  
 Lakeland, FL 33801

4a. Article Number  
 2333 612 521

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

7. Date of Delivery  
 10-2-98

5. Received By: (Print Name)  
 [Signature]

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

6. Signature: (Addressee or Agent)  
 X [Signature]

Thank you for using Return Receipt Service.

Z 333 612 521

US Postal Service  
**Receipt for Certified Mail**  
 No Insurance Coverage Provided.  
 Do not use for International Mail (See reverse)

Sent to Allan Smith	
Street & Number Orange Cogen	
Post Office, State & ZIP Code Lakeland FL	
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	1050231-00-AU 9-30-98 002-AC

PS Form 3800, April 1995

**PUBLIC NOTICE  
OF INTENT TO ISSUE  
AIR CONSTRUCTION  
PERMIT MODIFICATION  
STATE OF FLORIDA  
DEPARTMENT OF  
ENVIRONMENTAL  
PROTECTION  
DRAFT Permit  
Modification No.:  
1050231-002-AC,  
PSD-FL-208B  
Bartow Facility  
Polk County**

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit modification to Orange Cogeneration Limited Partnership, for their facility located in Bartow, Polk County. A Best Available Control Technology (BACT) determination was not required for this modification pursuant to Rule 62-212.400, F. A. C. and 40 CFR 52.21, Prevention of Significant Deterioration (PSD). The applicant's name and address are: Orange Cogeneration Limited Partnership by Orange Cogeneration GP, Inc., its general partner, 1125 US Hwy 98 South, Suite 100, Lakeland, Florida 33801.

The applicant has requested a one year extension on the date to comply with a lower emission limit (15 ppm) for nitrogen oxides (NOx) for the combined cycle combustion turbine which is primarily fired by pipeline quality natural gas. This extension is needed to allow time for the vendor to complete development of the dry low NOx control system. The emission limit will be 25 ppm until the proposed new deadline of January 1, 1999. This amendment also clarifies which fuels are to be fired during annual emission tests.

An air quality impact analysis was not conducted. Emissions from the facility will not consume PSD increment and will not significantly contribute to or cause a violation of any state or federal ambient air quality standards.

The Department will issue

the FINAL Permit Modification, in accordance with the conditions of the DRAFT Permit Modification 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 DRAFT Permit Modification issuance action for a period of 30 (thirty) days from the date of publication of this Notice. Written comments should be provided to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Mail Station #5505, Tallahassee, Florida 32309-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in this DRAFT Permit Modification, the Department shall issue a Revised DRAFT Permit Modification and require, if applicable, another Public Notice.

The Department will issue FINAL Permit Modification with the conditions of the DRAFT Permit Modification unless a timely petition for an administrative hearing is filed pursuant to Sections 120.569 and 120.57, F. S., or a party requests mediation as an alternative remedy under Section 120.573, F. S., before the deadline for filing a petition. Choosing mediation will not adversely affect the right to a hearing if mediation does not result in a settlement. The procedures for petitioning for a hearing are set forth below, followed by the procedures for requesting mediation.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative hearing in accordance with Sections 120.569 and 120.57, F. S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, telephone: 904/488-9370, fax: 904/487-4938. Petitions 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. A petitioner must 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 (or a request for mediation, as discussed below) 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 28-5.207 of the Florida Administrative Code.

A petition must contain the following information: (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Permit File Number, and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by

the petitioner, if any; (e) A statement of the facts that the petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement identifying the rules or statutes that the petitioner contends require reversal or modification of the Department's action or proposed action; and, (g) A statement of the relief sought by the petitioner, stating precisely the action that the petitioner wants the Department to take with respect to the Department's action or proposed action addressed in this notice of intent.

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 of intent. 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 person whose substantial interests are affected by the Department's proposed permitting decision, may elect to pursue mediation by asking all parties to the proceeding to agree to such mediation and by filing with the Department a request for mediation and the written agreement of all such parties to mediate the dispute. The request and agreement must be filed in (received by) the Office of General Counsel of the Department, 3900 Commonwealth Boulevard, Mail Station #35, Tallahassee, Florida 32399-3000, by the same deadline as set forth above for the filing of a petition.

A request for mediation must contain the following information: (a) The name, address, and telephone number of the person requesting mediation and that person's representative, if any; (b) A statement of the preliminary agency action; (c) A statement of the relief sought; and, (d) Either an explanation of how the requester's substantial interests will be affected by the action or proposed action addressed in this notice of intent or a statement clearly identifying the petition for hearing that the requester has already filed, and incorporating it by reference.

The agreement to mediate must include the following: (a) The names, addresses, and telephone numbers of any persons who may attend the

mediation; (b) The name, address, and telephone number of the mediator selected by the parties, or a provision for selecting a mediator within a specified time; (c) The agreed allocation of the costs and fees associated with the mediation; (d) The agreement of the parties on the confidentiality of discussions and documents introduced during mediation; (e) The date, time, and place of the first mediation session, or a deadline for holding the first session, if no mediator has yet been chosen; (f) The name of each party's representative who shall have authority to settle or recommend settlement; and, (g) The signatures of all parties or their authorized representatives.

As provided in Section 120.573, F. S., the timely agreement of all parties to mediate will toll the time limitations imposed by Sections 120.569 and 120.57, F. S., for requesting and holding an administrative hearing. Unless otherwise agreed by the parties, the mediation must be concluded within sixty days of the execution of the agree-

ment. If mediation results in settlement of the administrative dispute, the Department must enter a final order incorporating the agreement of the parties. Persons whose substantial interests will be affected by such modified final decision of the Department have a right to petition for a hearing only in accordance with the requirements for such petitions set forth above. If mediation terminates without settlement of the dispute, the Department shall notify all parties in writing that the administrative hearing processes under Sections 120.569 and 120.57 F. S. remain available for disposition of the dispute, and the notice will specify the deadlines that then will apply for challenging the agency action and electing remedies under those two statutes.

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 S. Magnolia Drive, Suite 4, Tallahassee, Florida, 32301, Telephone: 904/488-1344, Fax: 904/922-6979; Department of Environmental Protection, Southwest District Office, 3804 Coconut Palm Drive, Tampa, FL 33619, Telephone: (813) 744-6100, Fax: (813) 744-6084.

The complete project file includes the Draft Permit Modification, 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 Administrator, New Resource Review Section at 111 South Magnolia Drive, Suite 4, Tallahassee, Florida 32301, or call 904/488-1344, for additional information.

July 10, 1997-1910

P 265 659 228

US Postal Service  
**Receipt for Certified Mail**  
No Insurance Coverage Provided.  
Do not use for International Mail (See reverse)

Sent to <i>Mr. Allan Wade Smith</i>	
Street & Number <i>1125 US Highway 98 S.</i>	
Post Office, State, & ZIP Code <i>Lakeland, FL 33801</i>	
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 <i>1050231-002-AC 6-23-97</i>	
<i>PSD-FI-206B</i>	

PS Form 3800, April 1995

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: <i>Mr. Allan Wade Smith General manager Orangeco Generation L.P., Inc 1125 US Highway 98 S. Lakeland, FL 33801</i>	4a. Article Number <i>P 265 659 228</i>
5. Received By: (Print Name)	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
6. Signature: (Addressee or Agent) <i>X [Signature]</i>	7. Date of Delivery <i>6/25/97</i>
	8. Addressee's Address (Only if requested and fee is paid)

Thank you for using Return Receipt Service.



**CSW Energy, Inc.**

A Central and South West Company  
**Orange Cogeneration Facility**  
1901 Clear Springs Road  
Post Office Box 782  
Bartow, Florida 33831-0782

Telephone (863) 534-1141  
Facsimile (863) 533-4152

**RECEIVED**

AUG 31 2001

BUREAU OF AIR REGULATION

August 28, 2001

Mr. Al Linero, P.E.  
Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road, Mail Stop 5505  
Tallahassee, Florida 32399-2400

Re: Orange Cogeneration Limited Partnership  
Title V Air Permit # 1050231-AV-001, Damp DLE Modifications

Dear Mr. Linero:

This letter is to provide you an update status of the damp DLE engine modifications installed on the combustion turbines at the Orange Cogeneration Facility. As you recall, the new damp DLE technology will enable the turbines to meet the 15 ppm NOx requirement as set forth by the above referenced Title V permit. I am happy to report the engine modifications were completed during our May maintenance outage and have been successful in achieving a NOx emission concentration of less than 15 ppm and a corresponding emissions rate of less than 22.1 NOx lb/hour.

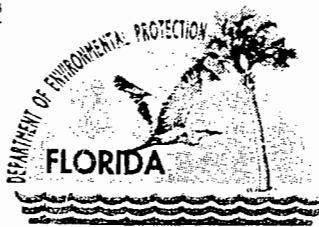
We are currently continuing to test the turbines under varying loads and conditions to ensure that the new modifications will perform well under all circumstances. Although some degradation of the engines may occur over time, the new technology should be able to adapt and control emissions to less than 15 ppm NOx.

Thank you for your time and consideration in working with Orange Cogeneration Limited Partnership and GE to make this technology a reality. If you have any questions regarding this correspondence, I may be contacted at 863-534-1141.

Sincerely,

Don Walters  
Plant Manager

cc: Wade Smith, OCLP



Jeb Bush  
Governor

# Department of Environmental Protection

Marjory Stoneman Douglas Building  
3900 Commonwealth Boulevard  
Tallahassee, Florida 32399-3000

David B. Struhs  
Secretary

November 24, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Wade Smith, General Manager  
Orange Cogeneration Limited Partnership  
1125 U.S. 98 South  
Suite 100  
Lakeland, Florida 338701

Re: DEP File No. (PSD-FL-206C)  
Orange Cogeneration / Polk County

Dear Mr. Smith:

Enclosed is one copy of the Draft Air Construction Permit Modification for the installation of wet technologies on Orange Cogeneration Units 1 and 2, specifically the implementation of SPRINT™ and selective water injection. The Department's Intent to Issue Air Construction Permit Modification and the "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT MODIFICATION" are also included.

The "PUBLIC NOTICE OF INTENT TO ISSUE AIR CONSTRUCTION PERMIT MODIFICATION" must be published within 30 (thirty) days of receipt of this letter. 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 amendment.

Please submit any written comments you wish to have considered concerning the Department's proposed action to A.A. Linero, P.E., New Source Review Section at the above letterhead address. If you have any other questions, please contact Mr. M. P. Halpin, P.E. at 850/921-9530.

Sincerely,

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

CHF/mph

Enclosures

In the Matter of an  
Application for Permit Modification by:

Orange Cogeneration Limited Partnership  
1125 U.S. 98 South, Suite 100  
Lakeland, Florida 33801

DEP File No. 1050231-005-AC  
Permit PSD-FL-206C  
Orange Cogeneration  
Polk County

**INTENT TO ISSUE AIR CONSTRUCTION PERMIT MODIFICATION**

The Department of Environmental Protection (Department) gives notice of its intent to issue an air construction permit modification (copy of DRAFT Permit modification attached) for the proposed action, as detailed in the application specified above, for the reasons stated below.

The applicant, Orange Cogeneration Limited Partnership (OCLP) applied on October 25, 1999, to the Department for an air construction permit modification to allow for the installation of NO<sub>x</sub> control equipment, including SPRINT™ and selective water injection for its combined cycle combustion turbines located at the Orange Cogeneration facility, Polk 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 action is not exempt from permitting procedures. The Department has determined that an air construction permit modification is required to install the associated NO<sub>x</sub> control equipment.

The Department intends to issue this air construction permit modification 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 Modification." The notice shall be published one time only in the legal advertisement section of a newspaper of general circulation in the area affected. Rule 62-110.106(7)(b), F.A.C., requires that the applicant cause the notice to be published as soon as possible after notification by the Department of its intended action. 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. 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). 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. 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 modification 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 days from the date of publication of "Public Notice of Intent to Issue Air Permit Modification." 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 modification 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.



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

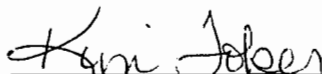
**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this INTENT TO ISSUE AIR CONSTRUCTION PERMIT MODIFICATION (including the PUBLIC NOTICE, and DRAFT permit modification) was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on 11-23-99 to the person(s) listed:

Wade Smith, Orange Cogeneration \*  
Gregg Worley, EPA  
Doug Neeley, EPA  
John Bunyak, NPS  
Bill Proses, DEP-SWD

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)

11-23-99  
(Date)

**TECHNICAL EVALUATION AND  
PRELIMINARY DETERMINATION**

Orange Cogeneration Limited Partnership  
Orange Cogeneration Facility  
Polk County

DEP File No. 1050231-005-AC  
PSD-FL-206C

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

November 24, 1999

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

## 1. Applicant

Orange Cogeneration Limited Partnership  
1125 U.S. Highway 98 South  
Suite 100  
Lakeland, FL 33801

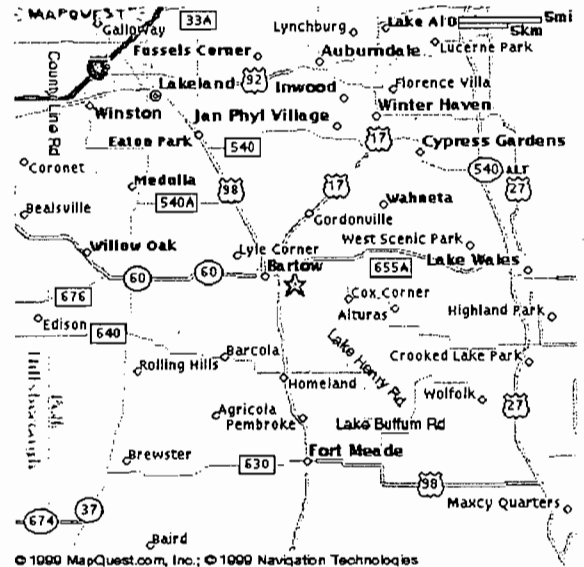
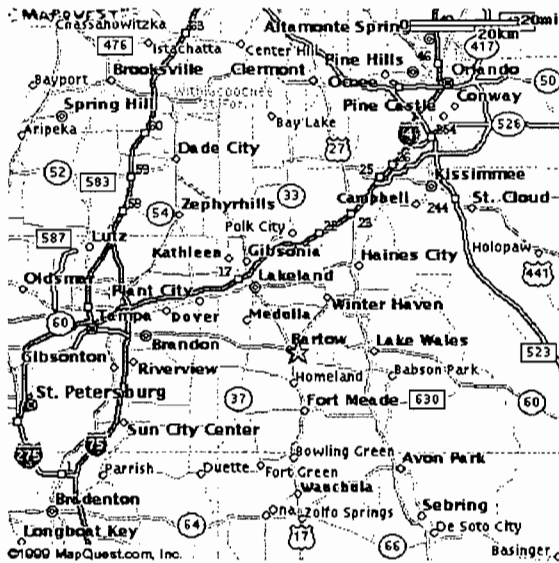
*Authorized Representative: Mr. Wade Smith, General Manager*

## 2. Source Name and Location

Orange Cogeneration Limited Partnership  
Clear Springs Road  
Bartow, Florida 33830

UTM Coordinates: Zone 17, 418.75 km East and 3083.0 km North

The location of the site is shown below:



## 3. Source Description

The Orange Cogeneration Limited Partnership (OCLP) facility consists of two combustion turbines, each with an associated heat recovery steam generator; an auxiliary boiler, and “unregulated or insignificant” emissions units.

Each combustion turbine is a GE LM6000 DLE unit nominally rated at 40 MW generating capacity, with a maximum heat input for natural gas or biogas of 368.3 MMBtu/hr. The auxiliary boiler has a maximum heat input for natural gas of 100 MMBtu/hr.

## 4. Current Permit and Major Regulatory Program Status

The HRSGs and the combustion turbines are regulated under Rule 62-210.300, F.A.C. Permits Required. Based on the BACT and permit information, the combustion turbines are required to operate at lower NO<sub>x</sub> levels than authorized at this time. The original PSD permit authorized a NO<sub>x</sub> emission limit of 25 ppmvd until 12/31/97, after which the emission limit was to be reduced to 15 ppmvd. The

# TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

applicant filed two requests for extensions, which were granted by the Department, allowing for the current compliance date of 12/31/99 in order for the lower NO<sub>x</sub> limit to be achieved.

## 5. Permit Modification Request

On October 25, 1999 the Department received a request from OCLP for modification of its permit to install SPRINT™ and selective water injection on Emission Units 001 and 002. The applicant indicated that this request was required in order to meet the Department's BACT limit of 15 ppmvd on each combustion turbine. General Electric has "partnered" with OCLP and met with the Department on September 2 in order to present the subject proposal. GE and OCLP believe that pursuing this proposal will lead to a system solution which has environmental benefits over SCR, will yield lower on-going operating costs when compared to SCR and will advance the state of the art in emissions technology for the LM6000 AeroDerivative gas turbine.

Orange Cogeneration has further requested that the Department revise the PSD permit to reflect that the 25 ppmvd limit for NO<sub>x</sub> is appropriate as BACT if the subject proposal should fail to achieve 15 ppmvd.

## 6. Emissions Increases Due to Modification/Method of Operation

The only emissions increase which this modification will cause relate to the differential NO<sub>x</sub> emission levels of 15 ppmvd versus 25 ppmvd for the extension period requested. The Department estimates this as per the table below. This is based on 8760 hours of operation at maximum output for each CT, although this is unlikely based upon past operation (actual past emissions are also shown):

EMISSIONS INCREASES DUE TO PERMIT EXTENSION ON BOTH CT's THROUGH 8/2001

Unit	Emission Rate 15 ppm (lb/hr)	Emission Rate 25 ppm (lb/hr)	Emission Increase At 8760 hr (TPY)	Actual Emissions (96-98 avg. TPY)	Facility PTE Increase (TPY)	PSD Threshold tons/yr
1	23.1	38.5	67.4	57.3	Yr. 2000 - 134.8	40
2	23.1	38.5	67.4	55.0	Yr. 2001 - 89.9	40

## 7. Conclusions

Based upon information that the Department has reviewed, this project has the ability to reduce NO<sub>x</sub> emissions to the required 15 ppmvd rate. Therefore, the Department concludes that the project is worth implementing and authorizes the appropriate extension of time in order to do so. However, the applicant demonstrates some "hedging" based upon the request to revise the permit limit to 25 ppmvd should the proposal fail. Accordingly, the Department concludes that there exists some possibility that the proposal will fail and is not inclined to revise the permit to the 25 ppmvd level in the event of failure. Additionally, since this action represents the third extension of time to achieve 15 ppmvd, no further extensions of time should be authorized to meet the targeted rate, short of the time required to implement an SCR.

For further details regarding this review, contact:

*Michael P. Halpin, P.E., Review Engineer  
New Source Review Section  
Bureau of Air Regulation  
850/488-0114*

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

STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Orange Cogeneration Limited Partnership, Orange Cogeneration Facility  
DEP File No. PSD-FL-206C, 1050231-005-AC  
Polk County

The Department of Environmental Protection (Department) gives notice of its intent to issue a modification of a Prevention of Significant Deterioration (PSD) Permit to Orange Cogeneration Limited Partnership (OCLP) for its Orange Cogeneration Facility located in Polk County. A Best Available Control Technology (BACT) determination was not required for this modification pursuant to Rule 62-212.400, F.A.C., Prevention of Significant Deterioration (PSD). The applicant's name and address are: Orange Cogeneration Limited Partnership, 1125 U.S. 98 South, Suite 100, Lakeland, Florida 33801.

This is an existing facility consisting of two nominal 40 Megawatt combined cycle combustion turbines (Units 1 and 2). Both units fire natural gas and biogas with heat inputs of 368.3 MMBtu/hr each (at an ambient temperature of 47°F). These units have a Title V permit (1050231-001-AV) issued by the State of Florida.

The permitted emission rate of nitrogen oxides (NO<sub>x</sub>) for Units 1 and 2 while firing natural gas or biogas is 25 ppm. On an annual basis the permitted tons per year (TPY) of potential NO<sub>x</sub> emissions are 168.6 each. Effective January 1, 2000 the permitted NO<sub>x</sub> emission rate for each unit decreases to 15 ppm while firing natural gas or biogas firing, causing the potential TPY of NO<sub>x</sub> to be equal to 101.2 (a reduction of 67.4 TPY for each unit).

OCLP requests that the aforementioned NO<sub>x</sub> emission rates for each unit remain at 25 ppm, for a period of time adequate to allow for the installation and testing of wet technologies. OCLP has determined that an extension of 20 months (through August 2001) will allow adequate time for the units to be capable of achieving the lower (15 ppm) limits through the application of this technology. No other emission limit increases are requested.

It is noted that emissions from each unit have ranged from 52.5 to 61.1 tons per year of NO<sub>x</sub> over a 3-year period. This reflects the intermediate loading duty of these units. It is expected that each unit will typically operate in a similar manner in the future.

The Department will issue the final permit modification 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 14 (fourteen) days from the date of publication of "Public Notice of Intent to Issue Air Construction Permit Modification." 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 modification 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 S. Magnolia Drive, Suite 4  
Tallahassee, Florida 32301  
Telephone: 850/488-0114  
Fax: 850/922-6979

Department of Environmental Protection  
Southwest District Office  
3804 Coconut Palm Drive  
Tampa, Florida 33619-8218  
Telephone: 813/744-6100  
Fax: 813/744-6084

The complete project file includes the Draft Permit modification, 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.



GE Power Systems  
One Neumann Way, S158  
Cincinnati, OH 45215-1988  
Phone: (513) 552-5925  
Fax: (513) 552-5059

October 18, 1999

Orange Cogeneration Limited Partnership  
1125 US 98 South, Suite 100  
Lakeland, FL 33801

Attn: Wade Smith

The purpose of this letter is to document two new technical alternatives that have the potential to achieve the desired emission levels of 15 ppm NO<sub>x</sub> without the use of exhaust treatment. The new alternatives are:

- Application of Sprint™ technology
- Use of selective H<sub>2</sub>O injection into the combustor

These alternatives were presented to the Florida Department of Environmental Protection (DEP) in a meeting held September 2, 1999. A copy of that presentation is attached for reference.

## Background

During the last six months, GE evaluated various alternatives to meeting the contractual agreements with Orange Cogeneration Limited Partnership (OCLP) regarding gas turbine NO<sub>x</sub> emissions. These were documented in a 6-25-99 letter from OCLP to FL-DEP.

Technically viable alternatives evaluated included SCR and derated LM6000PD. Of these, SCR was the more cost effective.

About the same time (June 1999) GE conducted some additional measurements which suggested that the needed NO<sub>x</sub> improvements could likely be achieved via small amounts of H<sub>2</sub>O injection using Sprint™ technology and/or by selectively injecting H<sub>2</sub>O into certain areas of the combustor. GE disclosed this work to the FL-DEP in early July and made a technical presentation on Sept. 2 at Tallahassee.

The advantages of using "damp" technology over SCR are as follows:

- Provides lower total emissions to atmosphere (when ammonia slip is considered).
  - An SCR with 10 ppm ammonia slip will add an additional 48 ton per year of NH<sub>3</sub>. For the two gas turbines at the plant. Additional introduction of ammonia into the atmosphere is a concern since it could potentially lead to increased O<sub>2</sub> consumption by algae in sensitive water areas causing fishkills or other degradation of the environmental ecosystems.
  - Therefore damp technology would avoid 48 ton per year of additional emissions.
- Avoids visible haze emissions associated with ammonia slip
- Avoids possible complaints of odor due to ammonia
- Reduces operating costs
  - Ammonia costs
  - Catalyst replacement costs
  - Catalyst disposal costs
  - Gas turbine performance losses due to SCR back pressure
- Avoids additional opportunity for “fugitive” ammonia release and impacts to nearby residential areas due to transportation, handling and storage

This memo provides the technical rationale and proposal to pursuing “damp” technology to capitalize on the aforementioned benefits.

## SPRINT™ Technology

Tests were conducted at the OCLP facility at Bartow, Florida that included injecting a water mist into the engine inlet. The tests were conducted at high power operating conditions and the water injection rate was approximately 5 gallons per minute. Figures 1 and 2 show the results of these tests for the two different engines at the site. These figures show how NO<sub>x</sub> emissions vary as a function of power with and without water injection into the engine inlet. With water injection NO<sub>x</sub> emissions were lower by approximately three ppm at a given power level. The results were nearly identical on both of the engines at the site.

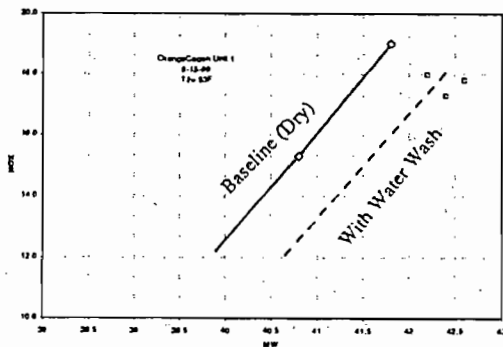


Figure 1  
SPRINT Results on Unit #1

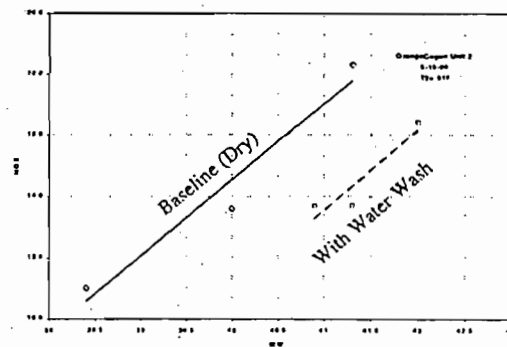


Figure 2  
SPRINT Results on Unit #2



What is significant in these results is that data obtained during the tests indicate that the NOx permit level of 15 PPM was *nearly achieved* on both engines at rated power. In fact, NOx levels of 15.5 and 16.0 PPM were recorded on units one and two, respectively.

This demonstration was conducted using a crude water mist injection system that is normally used to clean the engine inlet, which is known to produce a circumferentially non-uniform water mist. This is significant in two respects. First, it can be expected that a system that provides more uniform injection will also provide lower emission levels. Second, the demonstrator system used for the tests is not suitable for long term operation. GE is currently developing a system for the LM6000 PC that should provide a uniform injection pattern. This system will be developed and demonstrated during fourth quarter 1999. This system would then have to be adapted for use on the LM6000PB models at OCLP.

## Selective Water Injection

### Major factors driving and NOx emissions on LM6000PB

The LM6000PB combustor is a triple annular design in which there are three concentric burning zones called domes. At high power operating conditions all three combustor domes are lit. Also, at these conditions all engine bleeds are closed and the control mode is called "throttle push". In throttle push control mode the flame temperatures in the inner and outer domes ("C" and "A" domes) are regulated to a control schedule that is determined by combustor acoustic boundaries. As power is increased, inner and outer dome flame temperatures are regulated to preset temperatures and any additional fuel flow required to achieve power is fed to the center dome ("B" dome).

Therefore, during throttle push control mode, the B dome temperature increases as power is increased. The NOx also increases as power is increased.

Statistical evaluation of NOx emissions during these operating conditions has verified that the B-dome flame temperature is the main NOx production driver. *Therefore, control of the B dome flame temperature is the primary key to achieving low NOx on the LM6000.*

Previously, the strategy that was being pursued to lower NOx emissions was to add more air to this dome. While high flow premixers achieved some success in reducing NOx by adding air to the B dome, there were several factors which limited the amount of air which could be added to this dome. These included issues relative to idle operation and turbine cooling.

## Method for controlling B dome temperature

The Sprint™ feasibility data was encouraging in that water could be added into the engine system without increasing combustor acoustic activity.

This suggests that low levels of water or steam could be introduced into the B dome region of the combustor thereby reducing temperatures and suppressing NOx generation. By so doing, it should be possible, at the OCLP facility rating condition, to duplicate flame temperatures at the minimum NOx point thereby achieving the lowest possible NOx emissions from these gas turbines. The current LM6000s at the OCLP plant have produced NOx emissions levels in the range of the 12-13 ppm at the minimum NOx point. GE believes that, with the use of water or steam injection, levels below 15 ppm may be achieved at the rated conditions for OCLP.

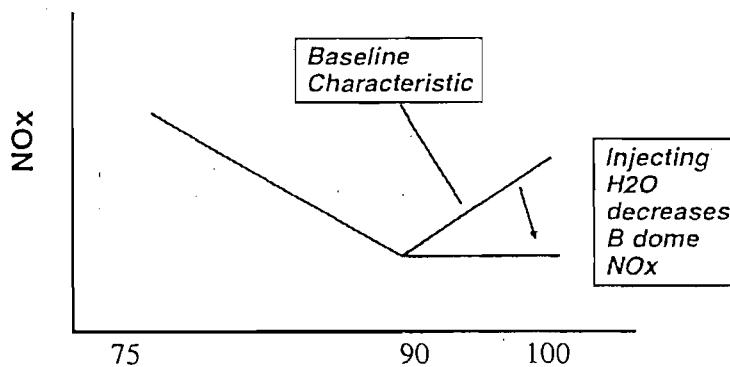


Figure 3 Impact of H2O Injection on NOx Emissions Characteristic

Figure three (above) shows how water or steam injection could potentially flatten out the NOx versus power characteristic and high power. This could also benefit the degradation characteristics of the engine. As fuel flow increases are required to maintain power as the units performance degrades between major maintenance repair cycles, resulting B dome temperature increases can conceivably be offset by water flow increases.

## Technology demonstration plan

GE proposes to demonstrate this technology using an existing dual fuel dry low emissions premixer design. Water or steam will be introduced into the B-dome of the combustor using the liquid passages in the dual fuel premixer.

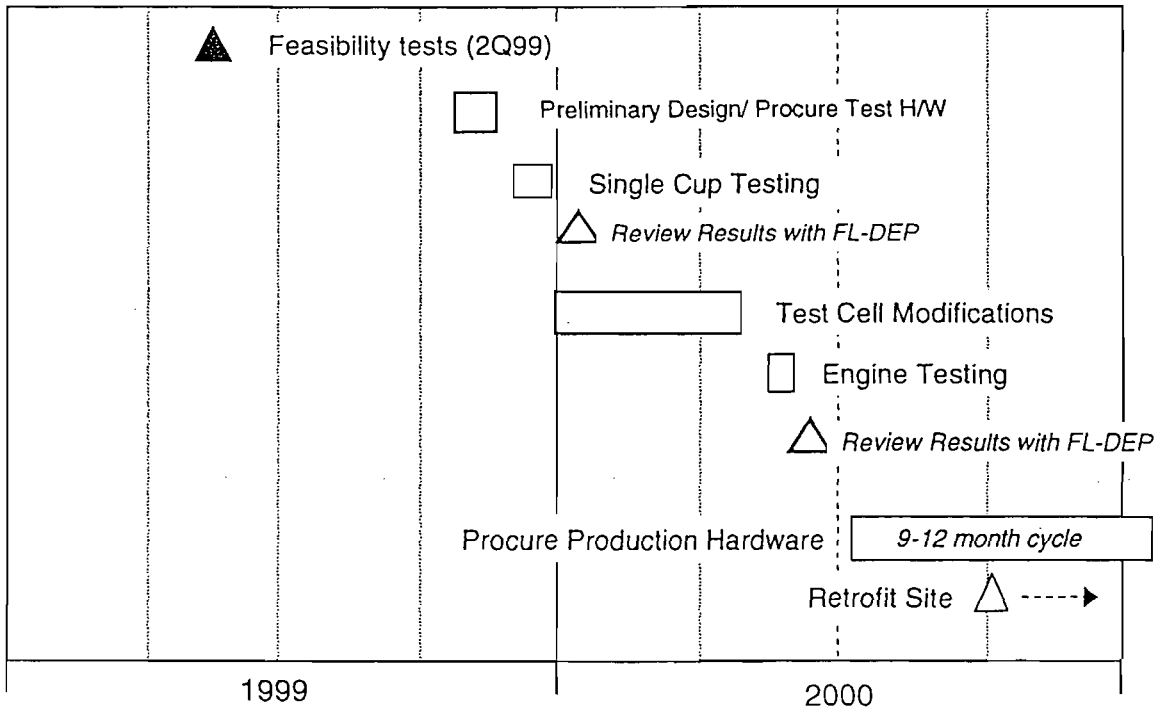
The first element of the program will be to conduct a single test in a combustor rig to determine lean blow out characteristics and flame stability with water and steam

injection. This test will determine whether water or steam is the best alternative for achieving the B dome NOx suppression.

After a determination is made whether water or steam is the best alternative, an engine demonstration test will be undertaken, in GE's engine test facility. The outcome of the engine test will determine if selective water injection, or SPRINT™, or if some combination of the two approaches provides the best solution. It should be noted that the selective water injection system, by itself, may satisfy contract requirements and, in that event, GE reserves the right to implement this system solely as a resolution to this contract. The test will also determine if there are any technology issues, such as acoustic boundaries or CO emissions, that will require further development.

The availability of hardware and the modification of the test cell for water injection and SPRINT™ operation will pace this test. The engine test will be complete no later than the end of June 2000. At that time, a technical review will be conducted with the FL-DEP and a determination made as to whether this approach is practical for commercialization. A preliminary milestone chart is provided below.

## Water Injection Program Schedule



If the wet injection scheme is shown to be feasible, GE intends to proceed with design and procurement of a production quality system to be installed at the OCLP facility. The cycle time will depend on whether there are changes required to the

fuel nozzles, however it is expected that this could be accomplished by end June 2001.

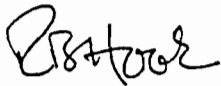
If, on the other hand, it is determined that this technology is not capable of achieving the permit levels at the OCLP plant, installation of selective catalytic reduction systems can be pursued to address the emissions limit. GE is working very closely with an SCR supplier to make commercial arrangements for this scenario.

### Summary

We believe that pursuing the proposed technology demonstration plan will lead to a system solution which has many environmental benefits over SCR, will be a favorable alternative in terms of net plant profitability for OCLP due to lower on-going operating costs when compared to SCR, and will also advance the state of the art in emissions technology for the LM6000 AeroDerivative gas turbine

Based on our discussion in Tallahassee earlier this month, we are optimistic that the regulatory agencies and other concerned parties will find value in these advantages and provide a permit extension to mid-2001 to allow us to demonstrate this technology and implement it at the site.

Best regards,



RB Hook  
LM6000 Technical Program Mgr.  
GE Industrial AeroDerivative Gas Turbines

Concurred:



Bob Ausdenmoore  
Systems Engineer  
GE Industrial AeroDerivative Gas Turbines



November 24, 1999

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Wade Smith  
General Manager  
Orange Cogeneration Limited Partnership  
1125 US Highway 98 South  
Suite 100  
Lakeland, Florida 33801

Re: DEP File No. 1050231-005-AC; Modification of Permit No. PSD-FL-206C  
Orange Cogeneration / Polk County

The applicant, Orange Cogeneration Limited Partnership (OCLP), applied on October 25, 1999, to the Department for a modification to air construction permit number PSD-FL-206C for its Orange Cogeneration Facility located in Polk County. The request is to allow the facility to install NO<sub>x</sub> control equipment on Emission Units 001 and 002, GE LM 6000 DLE units configured for combined cycle operation. The specific equipment requested will allow SPRINT™ and selective water injection to be installed in addition to the Dry Low Emissions equipment. The Department has reviewed the modification request. The referenced permit is hereby modified as follows:

**Specific Condition 8 and Table 1 (note e):** Each CT shall have a maximum heat input (LHV) of 368.3 MMBtu/hr, which is approximately 389,300 CFH of natural gas, when using dry low NO<sub>x</sub> and/or wet injection technologies technology to control NO<sub>x</sub> emissions.

**Specific Condition 10:** Prior to ~~September~~ January 1, 2000 2001, the maximum NO<sub>x</sub> concentration, 1 hour average, from each CT/HRSG unit shall not exceed 25 parts per million by volume dry corrected to 15 percent oxygen at ISO standard ambient conditions (ppmvd @ 15% O<sub>2</sub> at ISO conditions), as determined by the procedures in Specific Conditions No. 16, 17 and 18.

**Specific Condition 11 and Table 1 (note d):** After ~~December 31, 1999~~ August 31, 2001, the maximum NO<sub>x</sub> concentration, + 24-hour block average, from each CT/HRSG unit shall not exceed 15 ppmvd @ 15% O<sub>2</sub> at ISO conditions as determined by the procedure in Specific Condition Nos. 16, 17 and 18. No further extensions of this permit shall be granted for the purpose of achieving the targeted 15 ppmvd NO<sub>x</sub> emissions, with the exception of a reasonable time required to install SCR. The permittee shall obtain prior approval from the Department for any air pollution control equipment not addressed in this permit that is needed to meet the NO<sub>x</sub> emission standard. The Department may revise the limit based upon the capabilities of alternative equipment installed.

**Specific Condition 19:** Prior to ~~January 1, 1998~~ September 1, 2000, the permittee shall provide a report showing how the allowable NO<sub>x</sub> emissions of 15 ppmvd @ 15% O<sub>2</sub> ISO conditions is achieved by the CTs.

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permit modification is issued pursuant to Chapter 403, Florida Statutes:

Any party to this order (permit modification) has the right to seek judicial review of it under Section 120.68, F.S., by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel, Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within thirty days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida.

\_\_\_\_\_  
Howard L. Rhodes, Director  
Division of Air Resources  
Management

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this permit modification was sent by certified mail (\*) and copies were mailed by U.S. Mail before the close of business on \_\_\_\_\_ to the person(s) listed:

Wade Smith, Orange Cogeneration LP \*  
Doug Neely, EPA  
John Bunyak, NPS  
Bill Proses, DEP-SWD  
Mr. Gregg Worley, EPA

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)

\_\_\_\_\_  
(Date)

Florida Department of  
Environmental Protection

Memorandum

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TO: Clair Fancy

THRU: Al Linero *Al* 11/23

FROM: Michael P. Halpin *MH*

DATE: November 23, 1999

SUBJECT: Orange Cogeneration Limited Partnership  
Modification to LM6000 machines in order to meet 15 ppmvd NO<sub>x</sub> limitation  
DEP File No. 1050231-005-AC (PSD-FL-206C)

Attached is the public notice package for a modification to the PSD permit for Units 1 and 2 at Orange Cogeneration's facility in Polk County. The existing facility is comprised of two units, each of which is permitted to operate 8760 hours. Each unit is a (nominal) 40 MW GE LM6000 DLE aeroderivative combustion turbine-electrical generator configured for combined cycle

These units were required to meet a NO<sub>x</sub> limit of 15 ppmvd on natural gas by 1/1/1998, while permitted to operate at a limit of 25 ppmvd before that time. Two extensions were granted allowing the facility to meet the current compliance date of 1/1/2000.

The applicant has partnered with GE in the development of a solution, which will require wet technologies to be employed. The approval of the applicant's request requires an extension of the facility's current emission rate of 25 ppmvd by 20 months, including a status report, which must be submitted to the Department by 9/1/2000.

A Technical Evaluation is attached, which supports the applicant's project. I recommend your approval of the attached Intent to Issue. Although Day 90 does not occur until 2/4/00, the existing permit (which requires the NO<sub>x</sub> reduction) expires on 12/31/99. In order for this Draft permit to be effective on 1/1/00, the Notice will need to be published by 11/17/99.

AAL/mph

Attachments

Is your RETURN ADDRESS completed on the reverse side?

5

- Write your name and address on the 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.

- extra fee:
1.  Addressee's Address
  2.  Restricted Delivery
- Consult postmaster for fee.

<p>3. Article Addressed to:</p> <p>Wade Smith, Gen. Mgr.          Orange Cozen          1125 US 98 South          Lakeland, FL 33801</p>	<p>4a. Article Number          Z 031 392 010</p> <p>4b. Service Type</p> <p><input type="checkbox"/> Registered <input checked="" type="checkbox"/> Certified</p> <p><input type="checkbox"/> Express Mail <input type="checkbox"/> Insured</p> <p><input type="checkbox"/> Return Receipt for Merchandise <input type="checkbox"/> COD</p> <p>7. Date of Delivery          11-28-99</p>
<p>5. Received By: (Print Name)</p>	<p>8. Addressee's Address (Only if requested and fee is paid)</p>
<p>6. Signature: (Addressee or Agent)</p> <p><i>[Signature]</i></p>	

Thank you for using Return Receipt Service.

Return Receipt

Z 031 392 010

US Postal Service  
**Receipt for Certified Mail**  
 No Insurance Coverage Provided.  
 Do not use for International Mail (See reverse)

Sent to		Wade Smith
Street & Number		Orange Cozen
Post Office, State, & ZIP Code		Lakeland FL
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		11-23-99

PS Form 3800, April 1995

PSO-FI-206C





**RESPONSE REQUESTED**

June 25, 1999

**RECEIVED**

**JUN 28 1999**

**BUREAU OF  
AIR REGULATION**

Mr. A. A. Linero, P.E.  
Administrator, New Source Review Section  
Bureau of Air Regulation  
Florida Department of Environmental Protection  
Twin Towers Office Building  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Re: Orange Cogeneration Facility, Facility ID No.: 1050231  
Re-Evaluation of Best Available Control Technology (BACT) for Nitrogen Oxides

Dear Mr. Linero:

As was presented during our May 11, 1999 meeting, GE has been involved in a continuous program to reduce NO<sub>x</sub> emissions from the LM6000 in an effort to meet the 15 ppmvd permit limit at the Orange Cogeneration Facility. In its efforts, GE has spent approximately \$20 million on dry low NO<sub>x</sub> technology for the LM6000 program nationwide. These efforts have resulted in slight improvements in emissions but not at sufficient levels to meet the 15 ppmvd limit on continuous day to day operation. As a result, GE has reported that the technology barrier will not allow them to achieve the 15 ppmvd on our LM6000 units using dry low NO<sub>x</sub> technology alone.

Based on the results of the GE program and our earlier meeting, alternative solutions to reaching the 15 ppmvd limit have been evaluated. The alternatives have included the following:

- XONON Technology
- SCONO<sub>x</sub> Technology
- SCR Technology
- Derated LM6000 PD

For XONON Technology, GE's investigation revealed that it is not yet commercially available for an LM6000 combustion turbine. Since it is not commercially available it was rejected from further consideration as an available technology.

For SCONO<sub>x</sub> Technology, GE's investigation revealed that it is commercially available but not yet proven on units as large as the LM6000. According to GE, there is only one SCONO<sub>x</sub> unit in commercial service and it is on an LM2500 at Sunlaw "Federal Plant" facility in the Los Angeles area. This plant has been operating since 1996 at predominantly baseload operating conditions.

Reliability has not been demonstrated on plants the size of Orange Cogeneration nor on units which start up every day. GE's reservations center around long term durability of the system performance on a long term basis.

For SCR Technology, GE's investigation revealed that it is commercially available, mature, and capable of reducing emissions to the 15 ppmvd level and possibly lower. Based on its availability, GE obtained budgetary quotes from two SCR Vendors (Attachments 1 & 2). The quotes were used to perform economic analyses based on the EPA Guidelines and procedures used in their Control Techniques Guideline for Combustion Turbines. The economic analyses used to determine overall cost effectiveness of the SCR systems are contained in Attachment 3.

In addition to SCR, GE evaluated replacement of the existing units with derated LM6000 PD units. As GE reported during the meeting, the derated LM6000 PD units operating at 41.4 MW can meet the 15 ppmvd level, with data indicating the derated units can achieve levels as low as 13 ppmvd. As an available option, GE performed an economic analysis similar to that for the SCR systems to determine overall cost effectiveness of the option. The economic analysis is contained in Attachment 4. In addition to the higher cost, a concern with this option is that the LM6000 PD may not be able to sustain the current emission level over time due to age and performance degradation in general.

As requested, the focus of the BACT evaluation was placed primarily on the economic analysis since the environmental and energy impacts associated with SCR have been documented and found to be insufficient by themselves to reject the technology. For the economic analyses the following options were reviewed:

- Base Case - Existing LM6000 Combustion Turbines at 25 ppmvd.
- Option 1 - Replacement with the Derated LM6000 PD Units at 15 ppmvd (See Attachment 4)
- Option 2 - SCR System at 15 ppmvd (See Attachment 3)
- Option 3 - SCR System at 6 ppmvd (See Attachment 3)
- Option 4 - SCR System at 3.5 ppmvd (See Attachment 3)

The findings of the economic analysis for each option are summarized below.

Option #	Total Capital Investment (\$MM)	Total Annual Costs (\$K/year)	Incremental Cost Effectiveness (\$/ton)	Emission Reductions (TPY)
1	8.48	1,496	11,971	125
2	1.63-3.51	900-1,168	7,200 – 9,350	125
3	2.26-4.30	1,343-1,674	5,643 – 7,033	238
4	2.64	1,496	5,562	269

Attachment 5 contains a letter from GE which was issued following the May 11 meeting. The letter advises that GE's position is that by their contract GE is only responsible for achieving the 15 ppmvd emission limit and that any additional costs associated with a lower emissions

standard will be the responsibility of Orange Cogeneration Limited Partnership (“OCLP”). As for a breakdown of the costs between GE and OCLP, the Total Capital Investment should be covered by GE (although their letter indicates that they are only willing to pay to get the plant to 15 ppmvd) and the Annual Operating costs going forward will be paid by OCLP.

Option 4 represents the most stringent emission limitation for a greenfield facility proposing to construct in early 1999, the lowest incremental costs, and highest NO<sub>x</sub> reductions when compared to the other systems.

As was discussed during the meeting, the incremental costs for all the options are high and in response to comments made during the meeting GE has requested firm fixed price bids from the SCR vendors. Initial responses from the vendors have indicated that the capital costs may increase slightly since GE is now asking for contractual guarantees, but overall incremental cost effectiveness is not expected to vary by more than 10%. In addition, the vendors have been asked to evaluate the HRSGs to determine the available space for the ammonia injection system and catalyst. Based upon their evaluation, the vendors will quote systems capable of meeting NO<sub>x</sub> levels of 15, 6, and 3.5 ppmvd provided no structural changes are required. If structural changes are required, the vendors will quote systems providing the maximum available reduction without structural changes as we discussed during our meeting.

In response to comments that incremental costs of \$4,000 per ton have been reported for projects involving SCR, GE will update the economic analyses based on the firm fixed price bids should a new construction permit be required. However, the differences between the preliminary estimates and the Department’s \$4,000 per ton value may be associated with the higher exhaust flow rates of the GE Frame 7FA and larger Westinghouse units. As an example, the recently permitted Purdom Unit 8 project (Frame 7FA ) emits nearly 58 lb/hr of NO<sub>x</sub> at 9 ppmvd which can be scaled to approximately 97 lb/hr at 15 ppmvd. When compared to the LM6000's 37 lb/hr at 25 ppmvd which scales to about 23 lb/hr at 15 ppmvd the effects of combustion turbine size become apparent. Within an economic analysis a larger unit reducing emissions from 25 ppmvd to 3.5 ppmvd will have higher capital and operating costs but nearly four (4) times the available NO<sub>x</sub> reductions. This would account for the lower incremental costs associated with SCR systems on these larger combustion turbines.

As requested during the meeting, we are formally presenting the economic analyses associated with the available alternatives for review by both the Department and the Park Service for purposes of determining the economic feasibility of SCR. Mr. Darrel Graziani, formally of Foster Wheeler Environmental, discussed the issue of re-evaluating the BACT for the facility with Mr. Don Shepard of the Park Service. Mr. Graziani reported that the Park Service would be open to the re-evaluation pending verification with the Department.

It is our understanding that if the Department determines that SCR is not economically feasible for our site, we will be required to submit an application for a new construction permit. The application will reflect the relaxation of the federally enforceable 15 ppmvd NO<sub>x</sub> emission limitation. In addition, the application will include a full BACT analysis of the available alternatives, technical feasibility, and economic impacts. Technical feasibility for SCR will

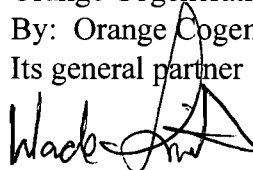
focus primarily on the need for structural changes to the HRSG to meet the 15, 6, and 3.5 ppmvd NO<sub>x</sub> levels with the lower levels rejected if structural changes are required. However, if the Department determines that SCR is economically feasible for our site, we will be required to install the system and meet an appropriate emission limit specified by the Department. This new emission limitation will account for any structural limitations of the HRSG as identified by the vendors during the bid process.

As suggested during the meeting, we are requesting a formal determination by the Department on the economic feasibility of SCR for the Orange Cogeneration Facility based on the information presented in this letter. In an attempt to meet the extension schedule which is due to expire on 12/31/99, we will need to initiate actions to secure a new construction permit or install an SCR system within the next month.

For a new construction permit, our consultant has advised us that they will need 30 days to develop the application package provided no additional dispersion modelling is required. Following application development our schedule includes the Department's 90 day review period and a 30 day public comment period with issuance of the permit on or about January 1, 2000.

For SCR installation, the schedule includes receiving bids by July 9 and a determination on the economic feasibility from the Department by July 30. The schedule includes a two (2) week period following the determination for negotiations on the final emission limit, including review of the vendor findings associated with structural capabilities of the HRSG. This would allow approximately 5.5 months to purchase, install, and conduct performance tests on the SCR, which may not be sufficient time. Based on the availability of the equipment and installation contractors, OCLP would submit a formal compliance plan within 60 days of the negotiated emission limit including a final compliance date.

As you are aware, this issue has been on going for several years and your immediate attention is greatly appreciated. Should you have any additional questions please feel free to contact me at 941-682-6338.

Sincerely,  
Orange Cogeneration Limited Partnership  
By: Orange Cogeneration GP, Inc.  
Its general partner  
  
Wade Smith  
General Manager

cc: D. Shepard, Park Service  
C. St. Cin, Foster Wheeler Environmental Corporation  
RB Hook, GE Industrial AeroDerivative  
D. Oehring -CSWE Operations Orange Cogeneration

cc: J. Kahn  
J. Koerner 7BAR

APR 23 09 10:20 PM FW SERVICE

908 713 3210 TO 915135525722

P.01/08



→ Guynece Johnson  
→ Dennis O'Connell  
→ Wade Smith

**FOSTER WHEELER ENERGY CORPORATION**

PERRYVILLE CORPORATE PARK • CLINTON • NJ 08809 • 4900 • 908 • 730 • 4000

*Info*

FAX TRANSMITTAL SHEET 04/23/99

TO: **MR. RICK HOOK**

FROM: **YAJAIRA ORTIZ**

COMPANY: **CSW ENERGY**

TOTAL NO. OF PAGES INCLUDING COVER: **8**

FAX NUMBER: **(513) 552-5722**

SENDER'S TELEPHONE NUMBER: **(908) 713 - 3315**

PHONE NUMBER:

SENDER'S FAX NUMBER: **(908) 713 - 2405**

**SCR BUDGETARY PRICE : FWEC P856**

Dear Mr. Hook,

Attached please find a budgetary pricing for your CSW Energy Project, Tampa Florida. Referring to the two (2) GE LMP 6000 turbines.

Should you need any further information please contact myself or Dr. Howard Franklin.

Sincerely,

Yajaira Ortiz  
SCR Systems Engineering



# FOSTER WHEELER ENERGY CORPORATION

PERRYVILLE CORPORATE PARK • CLINTON, NEW JERSEY 08809-4000 • PHONE 908-730-4000

April 23, 1999  
P856

Mr. Rick Hook  
CSW Energy  
Tampa, Fl

**Subject:** SCR Estimate for CSW Energy Project, Tampa, Fl  
FWEC Services Reference No. P-856

**References:** 1. Estimate Request by Email from Mr. Darrel Graziani to Dr. Howard Franklin, dated 4/15/99 - 4/22/99

Dear Mr. Hook:

Foster Wheeler Energy Corporation, Services Division is pleased to have this opportunity to provide budgetary pricing for the subject SCR system based upon the flow rates and information provided by Mr. Darrel Graziani.

### COMMERCIAL:

The budgetary pricing (excluding all taxes) for the design and supply of two (2) Aqueous Ammonia, SCR Systems:

**OPTION 1** .....\$930,000  
Area: 9'2" w x 38' h  
Inlet NOx 25 ppmvd  
Outlet NOx 15 ppmvd  
NO TRANSITIONS

**OPTION 2** .....\$930,000  
Area: 15'10.75" w x 44'3.5" h  
Inlet NOx 25 ppmvd  
Outlet NOx 15 ppmvd  
NO TRANSITIONS

**OPTION 3** .....\$1,290,000  
Area: 9'2" w x 38' h  
Inlet NOx 25 ppmvd  
Outlet NOx 6 ppmvd  
TRANSITIONS

**OPTION 4** .....\$1,000,000  
Area: 15'10.75" w x 44'3.5" h  
Inlet NOx 25 ppmvd  
Outlet NOx 6 ppmvd  
NO TRANSITIONS

**OPTION 5** .....\$1,518,000  
Area: 9'2" w x 38' h  
Inlet NOx 25 ppmvd  
Outlet NOx 3.5 ppmvd  
TRANSITIONS

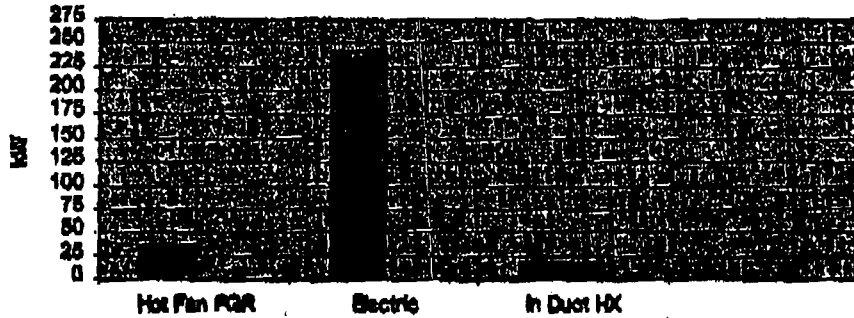
**OPTION 6** .....\$1,570,000  
Area: 15'10.75" w x 44'3.5" h  
Inlet NOx 25 ppmvd  
Outlet NOx 3.5 ppmvd  
TRANSITIONS

### COMMENTS

Our budgetary pricing is based on the referenced data. Comments and exceptions include:

1. FWEC reserves the right to revise this budgetary quote upon receipt of a formal Request for Quote.
2. Any purchase order must be based upon Foster Wheeler acceptable Terms and Conditions.
3. The particulars of the fuel and flue gas are not given. Should either fuel contain potential catalyst poisons (Na, Si, HF, HCl, SO<sub>x</sub>) or NH<sub>3</sub> oxidizing agents (Pt, Pd, Rh, Os, Ir) that will be in the flue gas and/or dust in abnormally high levels please inform us immediately for possible catalyst design modification.
4. NH<sub>3</sub> oxidizing agents from other areas (for example, CO catalyst) shall not be dispersed to the SCR catalyst.
5. The allowed start-up and shut-down temperature gradient for the catalyst is 10 °C/min below and 60 °C/min above the flue gas dew point.
6. NO<sub>x</sub> reduction requires the proper operation of the SCR system, including the control system per our logic and control panel.
7. The maximum allowable exhaust/flue gas temperature at the catalyst is 800 °F. The minimum operating temperature is 500 °F.
8. FWEC or its agent shall be allowed to witness and/or inspect the catalyst storage .
9. FWEC and/or its agent shall be allowed to comment upon SCR catalyst test procedures and witness any performance tests.
10. Performance of the catalyst is dependent on reasonably uniform flue gas distribution at the AIG and catalyst as well as sufficient mixing time between the AIG and catalyst. The flue gas distribution at the ammonia injection grid should satisfy an RMS deviation  $\leq$  10% of the mean. At the catalyst inlet the flow distribution should satisfy an RMS deviation  $\leq$  15% of the mean. The AIG should be located sufficiently upstream of the SCR reactor to assure adequate residence time before the catalyst. The catalyst should not be blocked in such a way as to disrupt the flow distribution into the catalyst. The temperature distribution should no more than  $\pm$  20 °F at the catalyst.
11. FWEC does not recommend flue gas recirculation for vaporization and transport because of the higher fan energy requirement and problematic nature of a hot fan. In addition, flue gas recirculation cannot be used when firing oil containing any sulfur. SO<sub>x</sub> in the flue gas would react with the high concentration of ammonia in the mixing system and result in pluggage of the injection equipment. FWEC can provide flue gas recirculation equipment if requested.
12. Transitions are included for Options 3, 5, and 6. Off-skid piping is not included, FWEC does not know the corresponding pipe distances for an accurate estimate.
13. The FWEC design uses hot air through an in-duct heat exchanger for aqueous ammonia vaporization and transport. Ambient air from a dedicated blower is directed through a heat exchanger located after the SCR in the flue gas ducting. The In-Duct exchanger system has the advantages of using hot air as the ammonia vaporization, dilution and transport medium and the operational cost savings of using a cold air fan source without requiring any electric or steam heating.

Comparison of Energy Requirements for Vaporizing Systems



14. A scale model of catalyst and ammonia injection grid for aerodynamic model testing is not included in this scope. FWEC has sufficient experience to guide and avoid this expense. Should a model be required, FWEC suggests a computer model as an option to the 1/20 scale model.

REFERENCES

- Scope of Supply - General
- Scope of Supply - Aqueous Ammonia System
- Typical P&ID for In-Duct Heat Exchanger System

Please submit a formal request, including terms, when prepared for a complete proposal.

Very truly yours,

FWEC - Services

*Yajaira I. Ortiz*

Yajaira I. Ortiz  
SCR Systems Engineer



**FOSTER WHEELER ENERGY CORPORATION  
SCR SYSTEM  
SCOPE OF SUPPLY - GENERAL**

Page 1 of 1

ITEM	DESCRIPTION	FWEC SCOPE	OPTION	NOT Included
1	SCR CATALYST IN BASKETS	X		
2	AQUEOUS AMMONIA INJECTION SYSTEM	X		
3	ANHYDROUS AMMONIA INJECTION SYSTEM			X
<b>CATALYST REACTOR HOUSING:</b>				
4	CATALYST HOUSING WITH INTERNAL INSULATION AND LINER	X		
5	CATALYST MODULE SUPPORT STRUCTURE	X		
6	SPACE IN REACTOR FOR ADDITION OF CATALYST AT A LATER DATE			X
7	ADDITIONAL CATALYST SUPPORT STRUCTURE FOR ADDITION OF CATALYST IN THE FUTURE			X
<b>CATALYST HANDLING / MAINTENANCE FACILITIES:</b>				
8	CATALYST LOADING DOORS			X
9	ACCESS DOORS IF WE SUPPLY TRANSITIONS			X
10	MONORAIL AND HOIST			X
11	PLATFORMS, LADDERS AND STAIRWAYS			X
<b>HRSG TRANSITIONS:</b>				
12	INLET AND OUTLET TRANSITION DUCTS WITH INTERNAL INSULATION AND LINER		X	
<b>ACCESSORIES:</b>				
13	HOUSING SAMPLING PORTS - TRANSITIONS			X
14	CATALYST FOR SAMPLING CELLS	X		
15	FOUNDATIONS			X
16	SELF SUPPORT OF ITEMS WITHIN THIS SCOPE OF SUPPLY	X		
17	SURFACE PREPARATION PER THE SPECIFICATION	X		
18	SHIPMENT OF ALL EQUIPMENT TO SITE	X		
19	ERECTION OF CATALYST HOUSING			X
20	INSTALLATION OF AMMONIA INJECTION SKIDS			X
<b>TECHNICAL FIELD ASSISTANCE:</b>				
21	5 DAYS TECHNICAL FIELD ASSISTANCE FOR ERECTION AND INSTALLATION			X
22	TECHNICAL FIELD ASSISTANCE FOR START-UP OF CATALYST			X
23	TECHNICAL FIELD ASSISTANCE FOR PERFORMANCE TESTS			X

**FOSTER WHEELER ENERGY CORPORATION  
SCR SYSTEM SCOPE OF SUPPLY  
AQUEOUS AMMONIA INJECTION SYSTEM**

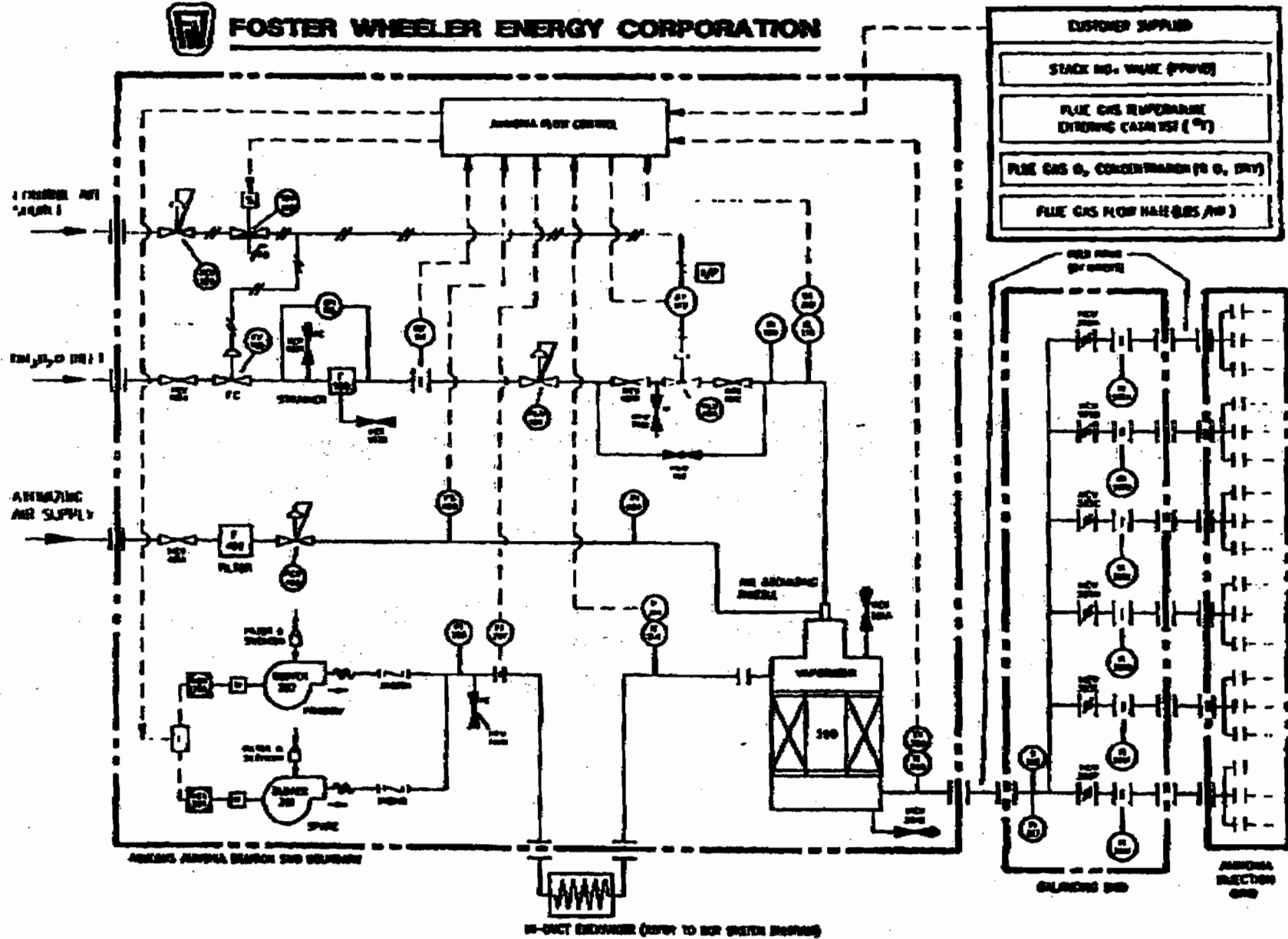
ITEM	DESCRIPTION	FWEO SCOPE	OPTION	NOT Included
1	AMMONIA INJECTION GRID WITH NOZZLES OR ORIFICES	X		
2	INJECTION GRID HOUSING & SUPPORT IN YOUR FLUE			X
<b>AMMONIA INJECTION HEADER ASSEMBLY (MOUNTED AT GRADE):</b>				
3	AMMONIA INJECTION HEADER - ONE PIECE	X		
4	MANUAL TRIM VALVES	X		
5	FLOW INDICATORS	X		
6	MANUAL SHUT-OFF VALVES	X		
7	SUPPORT OF INJECTION HEADER	X		
<b>AQUEOUS AMMONIA DILUTION/ EVAPORATION &amp; FLOW CONTROL SKID:</b>				
8	DILUTION AIR FANS WITH MOTOR (QTY. 2)	X		
9	IN-DUCT HEAT EXCHANGERS	X		
10	AMMONIA VAPORIZER/MIXER WITH INJECTION NOZZLE	X		
11	ALL AMMONIA/AIR PIPING AND VALVES ON SKID	X		
12	ALL CONTROL INSTRUMENTATION ON SKIDS	X		
13	TUBING AND WIRING ON SKID	X		
14	INSULATION ON SKID	X		
15	PROVISIONS FOR NITROGEN PURGE OF AMMONIA INJECTION SYSTEM	X		
16	AMMONIA FLOW CONTROL VALVE	X		
17	AMMONIA SHUT-OFF VALVE (SOLENOID OPERATED)	X		
18	AMMONIA FLOW TRANSMITTER	X		
19	DILUTION / VAPORIZING AIR FLOW TRANSMITTER	X		
20	ALL MANUAL BYPASS & ISOLATION VALVES ON SKID	X		
21	PRESSURE / TEMPERATURE TRANSMITTERS FOR CONTROL	X		
22	LOCAL PRESSURE / TEMPERATURE INDICATORS	X		
23	ALL INSTRUMENTATION AND VALVES FOR CONTROL OF EQUIPMENT ON INJECTION SKID	X		

**FOSTER WHEELER ENERGY CORPORATION  
SCR SYSTEM SCOPE OF SUPPLY  
AQUEOUS AMMONIA INJECTION SYSTEM**

<b>AQUEOUS AMMONIA STORAGE AND FORWARDING EQUIPMENT:</b>				
24	AQUEOUS AMMONIA STORAGE TANK			X
25	AQUEOUS AMMONIA TRUCK OFF-LOADING STA.			X
26	AQUEOUS AMMONIA FORWARDING PUMPS			X
27	AQUEOUS AMMONIA STRAINER			X
<b>EXTERNAL PIPING:</b>				
28	PIPING TO & DILUTION SKID TO INDUCT HEAT EXCHANGER			X
29	PIPING FROM AMMONIA DILUTION SKID TO AMMONIA INJECTION HEADER			X
30	PIPING FROM AMMONIA INJECTION HEADER TO HRSG DUCT (INJECTION GRID)			X
<b>ANCILLIARY EQUIPMENT:</b>				
31	FLUE GAS INLET TEMPERATURE TRANSMITTER			X
32	CATALYST PRESSURE DROP TRANSMITTER (1 FOR EACH CATALYST BED) (WITH HEAD INDICATOR)			X
33	LOCAL CATALYST PRESSURE DROP INDICATOR (1 FOR EACH CATALYST BED)			X
34	CONTROL LOGIC	X		
35	LOCAL CONTROL PANEL			X
36	CONTROL SYSTEM HARDWARE			X
37	MOTOR CONTROL CENTER			X
38	POWER SUPPLY OF ELECTRICAL EQUIPMENT			X
<b>FLUE GAS ANALYZERS:</b>				
39	SCR INLET NOX/O2 ANALYZER WITH PROBE AND SAMPLING LINE			X
40	SCR OUTLET NOX/O2 ANALYZER WITH PROBE AND SAMPLING LINE			X
41	SCR OUTLET NH3 ANALYZER WITH PROBE AND SAMPLING LINE	X		
<b>GAS SAMPLING PORTS:</b>				
42	INLET NOX/O2 PORT IN YOUR FLUE			X
43	STACK SAMPLING PORTS IN YOUR STACK			X



**FOSTER WHEELER ENERGY CORPORATION**



CUSTOMER SUPPLIED	
STACK NO. VALUE (PPHWD)	
FLUE GAS TEMPERATURE (ENTERING CASE) (°F)	
FLUE GAS O <sub>2</sub> CONCENTRATION (O <sub>2</sub> DRY)	
FLUE GAS FLOW RATE (GPM)	

**TYPICAL AQUEOUS AMMONIA SYSTEM  
PROCESS & INSTRUMENTATION DIAGRAM WITH IN DUCT HEAT EXCHANGER**

APR 27 '99 09:58AM M&ICS 513 552 5722 508 713 3210 TO 915135525722 P. 8/8

*Attachment 2*

**National Energy Production Corporation**  
**Industrial Division**  
1840 W. Fairbanks St., Lakeland, FL 33805  
Tel: (941) 687-1844 Fax: (941) 687-4498

April 29, 1999

Mr. Rick Hook  
General Electric IAD  
1 Neumann Way  
Cincinnati, OH 45215

**SUBJECT: SCR Installation**  
**Orange Cogeneration**  
**Bartow, FL**  
**Proposal No. 98P-1011**

Dear Mr. Hook:

We appreciate the opportunity to submit our budget to supply and install two (2) Selective Catalytic Reduction Units at the above location. The budget price includes the following :

1. Supply and installation of two (2) SCR Units
2. Ammonia tank and delivery system.
3. Ammonia system concrete containment area.
4. Ammonia piping from containment area to SCR units.
5. Modification of existing HRSGs, piping and platforms to accommodate SCR installation.
6. 2000 hrs. of NEPCO Engineering
7. 20 Days SCR Vendor Start Up Engineer
8. Power and Control Wiring ( assumes power is available from existing MCC )
9. Prime and Finish Painting of all new work and modifications.

Our proposal does not include instrumentation, modifications to the CEM System or initial fill of the Ammonia system tank.

The SCR design and fabrication will require approximately 12 months from initial order to delivery. Construction was estimated based on installing one unit at a time, 7 days / week , two 10 hr. shifts /

day schedule. The total construction time is estimated to be approximately 5 months, with one 6 week outage for each unit.

Our budget price for the above work is with a SCR Unit of reducing NOx to 6 ppm is \$3,372,917.00 (Three million three hundred seventy two thousand nine hundred and seventeen dollars).

Our budget price for the above work is with a SCR Unit of reducing NOx to 3.5 ppm is \$3,720,628.00 (Three million seven hundred twenty thousand six hundred and twenty eight dollars).

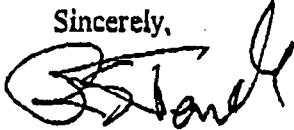
This budget is based on conceptual design and can be refined as the system design is developed further.

As you know, NEPCO designed and constructed the Orange Cogeneration Facility. Naturally we are very familiar with the plant and currently maintain an excellent working relationship with the plant operations group. We are extremely interested in the SCR installation project and would like to work with General Electric should the SCR installation provide the best solution in achieving the emission requirements. Our SCR vendor is very experienced in SCR technology and will guarantee design emissions levels.

If the SCR installation does not prove to be in the best interest of General Electric and your client, NEPCO would like to offer their assistance with any alternate solution. NEPCO's Lakeland office provides a local presence and has full capabilities in civil, mechanical and electrical construction services with full engineering support provided by our Redmond, Washington headquarters.

Thanks again for the opportunity and we look forward to hearing from you. Please contact me at (941) 687-1844 if you have any questions or comments.

Sincerely,



Robert Terrell, P.E.  
Project Manager

cc: H. Wyngate



**National Energy Production Corporation**  
Industrial Division  
1840 W. Fairbanks St., Lakeland, FL 33805  
Tel: (941) 687-1844 Fax: (941) 687-4498

August 18, 1998

Mr. Paul Zembrodt  
General Electric IAD  
1 Neumann Way  
Cincinnati, OH 45215

**SUBJECT: SCR Installation  
Orange Cogeneration  
Bartow, FL  
Proposal No. 98P-1010**

Dear Mr. Zembrodt:

We appreciate the opportunity to submit our budget to supply and install two (2) Selective Catalytic Reduction Units at the above location. The budget price includes the following :

1. Supply and installation of two (2) SCR Units
2. Ammonia tank and delivery system.
3. Ammonia system concrete containment area.
4. Ammonia piping from containment area to SCR units.
5. Modification of existing HRSGs, piping and platforms to accommodate SCR installation.
6. 1500 hrs. of NEPCO Engineering
7. 20 Days SCR Vendor Start Up Engineer
8. Power and Control Wiring ( assumes power is available from existing MCC )
9. Prime and Finish Painting of all new work and modifications.

Our proposal does not include instrumentation, modifications to the CEM System or initial fill of the Ammonia system tank.

The SCR design and fabrication will require approximately 9 months from initial order to delivery. Construction was estimated based on installing one unit at a time, 7 days / week, two 10 hr. shifts / day schedule.

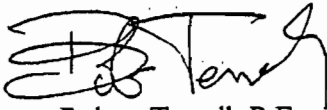
Our budget price for the above work is \$2,756,000.00 (Two million seven hundred fifty six thousand dollars). This budget is based on conceptual design and can be refined as the system design is developed further.

As you know, NEPCO designed and constructed the Orange Cogeneration Facility. Naturally we are very familiar with the plant and currently maintain an excellent working relationship with the plant operations group. We are extremely interested in the SCR installation project and would like to work with General Electric should the SCR installation provide the best solution in achieving emission requirements. Our SCR vendor is very experienced in SCR technology and will guarantee design emissions levels.

If the SCR installation does not prove to be in the best interest of General Electric and your client, NEPCO would like to offer their assistance with any alternate solution. NEPCO's Lakeland office provides a local presence and has full capabilities in civil, mechanical and electrical construction services with full engineering support provided by our Redmond, Washington headquarters.

Thanks again for the opportunity and we look forward to hearing from you. Please contact me at (941) 687-1844 if you have any questions or comments.

Sincerely,



Robert Terrell, P.E.  
Project Manager

cc: H. Wyngate  
M. Ranz  
S. Daniels



# Attachment 3

## FOSTER WHEELER ENVIRONMENTAL CORPORATION EXCEL 5.0 CALCULATION SHEET

By: RB Hook  
Date: 3/31/98  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**Description:** Incremental and total cost analysis for the SCR System. Cost factors and references listed. Capital costs estimate for the SCR was supplied by a vendor. SCR-BACT to 15 ppm, Quote F

### BACT ANALYSIS

#### CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION

COST ITEM	COST FACTOR	REFERENCE	COST (\$1999)	
<b>DIRECT COSTS (DC)</b>				
PURCHASED EQUIPMENT COSTS (PEC)				
<b>SCR &amp; AUXILIARY EQUIPMENT</b>	<b>AS ESTIMATED, A</b>	<b>VENDOR QUOTE</b>	<b>\$930,000.00</b>	
INSTRUMENTATION	0.05 X A	(EPA, 1990d)	\$46,500.00	
STATE SALES TAXES	0.05 X A	State Sales Tax	\$55,800.00	
FREIGHT	0.05 X A	(EPA, 1990d)	\$0.00	included
PEC SUBTOTAL	1.16 X A = B		<b>\$1,032,300.00</b>	
DIRECT INSTALLATION COSTS (DIC)				
FOUNDATIONS & SUPPORTS	0.08 X B	(ULRICH, 1984)	\$82,584.00	
LABOR	0.14 X B	(EPA, 1990d)	\$144,522.00	
ELECTRICAL	0.04 X B	(EPA, 1990d)	\$41,292.00	
PIPING	N/A	VENDOR QUOTE	-	
INSULATION	N/A	VENDOR QUOTE	-	
PAINTING	0.01 X B	(EPA, 1990d)	\$10,323.00	
DIC SUBTOTAL	0.27 X B	(EPA, 1990d)	<b>\$278,721.00</b>	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	<b>\$1,311,021.00</b>	
<b>INDIRECT COSTS (IDC)</b>				
ENGINEERING	0.10 X B	(EPA, 1990d)	\$103,230.00	
CONSTRUCTION OVERHEAD	0.05 X B	(EPA, 1990d)	\$51,615.00	
CONTRACTOR FEES	0.10 X B	(EPA, 1990d)	\$103,230.00	
CONTINGENCIES	0.03 X B	(EPA, 1990d)	\$30,969.00	
START-UP	0.02 X B	(EPA, 1990d)	\$15,646.00	5 days of support included in quote
PERFORMANCE TESTING	0.01 X B	(EPA, 1990d)	\$10,323.00	
TOTAL IDC	0.53 X B	-	<b>\$315,013.00</b>	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		<b>\$1,626,034.00</b>	

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**OPERATING COST FACTORS FOR SELECT CATALYTIC REDUCTION**

**COST DATA**

**CHEMICAL ENGINEERING PLANT COST INDEX**

1990	357.6	
1993	359.2	
Jun-99	392.3	estimate

**CAPITAL RECOVERY FACTOR (CRF) @j=10%,n=20:** 0.1175 cost of money 10%  
0.1  
20

**DIRECT ANNUAL COSTS, \$/YR**

	<b>FACTOR</b>	<b>REFERENCE</b>	<b>1999 COSTS, \$/YR</b>
OPERATING LABOR	\$27.82/HR @ 1HR/12HR(COT & EPA 1993b)		\$20,309
SUPERVISORY LABOR	15 % OF OPERATING L	(EPA, 1993b)	\$3,046
MAINTENANCE LABOR AND MATERIALS	1,250 (MW) + 25,800	(EPA, 1993b)	\$137,392
CATALYST REPLACEMENT (CR)	N/A	Vendor Estimate	\$88,000
CATALYST DISPOSAL	\$15/CF	(EPA, 1993b)	\$10,800
AQUEOUS AMMONIA	\$378/ton	(EPA, 1993b)	\$310,929
DILUTION SYSTEM	N/A	(EPA, 1993b)	-
ELECTRICITY	N/A	(EPA, 1993b)	-
PERFORMANCE LOSS	0.50%	(EPA, 1993b)	\$19,320
BLOWER	N/A	(EPA, 1993b)	-
PRODUCTION LOSS	N/A	(EPA, 1993b)	-
			<b>\$589,796</b>

Assume same as NEPCO  
Assume same as NEPCO  
Assume same as NEPCO

**INDIRECT ANNUAL COSTS, \$/YR**

OVERHEAD	60% OF ALL LABOR M	(EPA, 1990d)	\$96,448
INSURANCE & ADMINISTRATION	2.5% OF TCI	(EPA, 1990d)	\$40,651
CAPITAL RECOVERY	CRF X (TCI - CR)	N/A	\$173,393
			<b>\$310,493</b>

**TOTAL ANNUAL COSTS, \$/YR**

**\$900,289**

**TOTAL NET NOx REDUCTIONS (TPY)**

Oil Firing	0
Gas Firing	125
Total	<b>125</b>

**INCREMENTAL COST EFFECTIVENESS, \$/TON**

**\$7,202**

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**Description:** Incremental and total cost analysis for the SCR System. Cost factors and references listed. Capital costs estimate for the SCR was supplied by a vendor. **SCR-BACT to 15 ppm, Quote N**

**BACT ANALYSIS**

**CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION**

COST ITEM	COST FACTOR	REFERENCE	COST (\$1999)	
<b>DIRECT COSTS (DC)</b>				
PURCHASED EQUIPMENT COSTS (PEC)				
<b>SCR &amp; AUXILIARY EQUIPMENT</b>	<b>AS ESTIMATED, A</b>	<b>VENDOR QUOTE</b>	<b>\$2,749,762.40</b>	
INSTRUMENTATION	0.05 X A	(EPA, 1990d)	\$137,488.12	
STATE SALES TAXES	0.06 X A	State Sales Tax	\$164,985.74	
FREIGHT	0.05 X A	(EPA, 1990d)	\$137,488.12	
PEC SUBTOTAL	1.16 X A = B		<b>\$3,189,724.38</b>	
DIRECT INSTALLATION COSTS (DIC)				
FOUNDATIONS & SUPPORTS	0.08 X B	(ULRICH, 1984)	\$0.00	included in quote
LABOR	0.14 X B	(EPA, 1990d)	\$0.00	included in quote
ELECTRICAL	0.04 X B	(EPA, 1990d)	\$0.00	included in quote
PIPING	N/A	VENDOR QUOTE	-	
INSULATION	N/A	VENDOR QUOTE	-	
PAINTING	0.01 X B	(EPA, 1990d)	\$0.00	included in quote
DIC SUBTOTAL	0.27 X B	(EPA, 1990d)	<b>\$0.00</b>	
SITE PREPARATION				
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	<b>\$3,189,724.38</b>	
<b>INDIRECT COSTS (IDC)</b>				
ENGINEERING	0.10 X B	(EPA, 1990d)	\$0.00	included in quote
CONSTRUCTION OVERHEAD	0.05 X B	(EPA, 1990d)	\$0.00	included in quote
CONTRACTOR FEES	0.10 X B	(EPA, 1990d)	\$0.00	included in quote
CONTINGENCIES	0.03 X B	(EPA, 1990d)	\$318,972.44	final quote not complete - use 10%
START-UP	0.02 X B	(EPA, 1990d)	\$0.00	included in quote
PERFORMANCE TESTING	0.01 X B	(EPA, 1990d)	\$0.00	included in quote
TOTAL IDC	0.53 X B	-	<b>\$318,972.44</b>	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		<b><u>\$3,508,696.82</u></b>	

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**OPERATING COST FACTORS FOR SELECT CATALYTIC REDUCTION**

**COST DATA**

**CHEMICAL ENGINEERING PLANT COST INDEX**

1990	357.6
1993	359.2
Jun-99	392.3

estimate

**CAPITAL RECOVERY FACTOR (CRF) @j=10%,n=20:** 0.1175 cost of money 10%

0.1  
20

	<b>FACTOR</b>	<b>REFERENCE</b>	<b>1999 COSTS, \$/YR</b>
<b>DIRECT ANNUAL COSTS, \$/YR</b>			
OPERATING LABOR	\$27.82/HR @ 1HR/12HR(COT & EPA 1993b)		\$20,309
SUPERVISORY LABOR	15 % OF OPERATING L	(EPA, 1993b)	\$3,046
MAINTENANCE LABOR AND MATERIALS	1,250 (MW) + 25,800	(EPA, 1993b)	\$137,392
CATALYST REPLACEMENT (CR)	N/A	Vendor Estimate	\$88,000
CATALYST DISPOSAL	\$15/CF	(EPA, 1993b)	\$10,800
AQUEOUS AMMONIA	\$378/ton	(EPA, 1993b)	\$310,929
DILUTION SYSTEM	N/A	(EPA, 1993b)	-
ELECTRICITY	N/A	(EPA, 1993b)	-
PERFORMANCE LOSS	0.50%	(EPA, 1993b)	\$19,320
BLOWER	N/A	(EPA, 1993b)	-
PRODUCTION LOSS	N/A	(EPA, 1993b)	-
			<b>\$589,796</b>
<b>INDIRECT ANNUAL COSTS, \$/YR</b>			
OVERHEAD	60% OF ALL LABOR M	(EPA, 1990d)	\$96,448
INSURANCE & ADMINISTRATION	2.5% OF TCI	(EPA, 1990d)	\$87,717
CAPITAL RECOVERY	CRF X (TCI - CR)	N/A	\$394,530
			<b>\$578,696</b>
<b>TOTAL ANNUAL COSTS, \$/YR</b>			<b>\$1,168,492</b>
<b>TOTAL NET NOx REDUCTIONS (TPY)</b>			
Oil Firing			0
Gas Firing			125
Total			<b>125</b>
<b>INCREMENTAL COST EFFECTIVENESS, \$/TON</b>			<b>\$9,348</b>

360 cu ft  
93.9pph

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**Description:** Incremental and total cost analysis for the SCR System. Cost factors and references listed. Capital costs estimate for the SCR was supplied by a vendor. **SCR-BACT to 6 ppm, Quote F**

**BACT ANALYSIS**

**CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION**

COST ITEM	COST FACTOR	REFERENCE	COST (\$1999)	
<b>DIRECT COSTS (DC)</b>				
PURCHASED EQUIPMENT COSTS (PEC)				
SCR & AUXILIARY EQUIPMENT	AS ESTIMATED, A	VENDOR QUOTE	\$1,290,000.00	
INSTRUMENTATION	0.05 X A	(EPA, 1990d)	\$64,500.00	
STATE SALES TAXES	0.06 X A	State Sales Tax	\$77,400.00	
FREIGHT	0.05 X A	(EPA, 1990d)	\$0.00	included
PEC SUBTOTAL	1.16 X A = B		\$1,431,900.00	
DIRECT INSTALLATION COSTS (DIC)				
FOUNDATIONS & SUPPORTS	0.08 X B	(ULRICH, 1984)	\$114,552.00	
LABOR	0.14 X B	(EPA, 1990d)	\$200,466.00	
ELECTRICAL	0.04 X B	(EPA, 1990d)	\$57,276.00	
PIPING	N/A	VENDOR QUOTE	-	
INSULATION	N/A	VENDOR QUOTE	-	
PAINTING	0.01 X B	(EPA, 1990d)	\$14,319.00	
DIC SUBTOTAL	0.27 X B	(EPA, 1990d)	\$386,613.00	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	\$1,818,513.00	
<b>INDIRECT COSTS (IDC)</b>				
ENGINEERING	0.10 X B	(EPA, 1990d)	\$143,190.00	
CONSTRUCTION OVERHEAD	0.05 X B	(EPA, 1990d)	\$71,595.00	
CONTRACTOR FEES	0.10 X B	(EPA, 1990d)	\$143,190.00	
CONTINGENCIES	0.03 X B	(EPA, 1990d)	\$42,957.00	
START-UP	0.02 X B	(EPA, 1990d)	\$23,638.00	5 days of support included in quote
PERFORMANCE TESTING	0.01 X B	(EPA, 1990d)	\$14,319.00	
TOTAL IDC	0.53 X B	-	\$438,889.00	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		\$2,257,402.00	

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**OPERATING COST FACTORS FOR SELECT CATALYTIC REDUCTION**

**COST DATA**

**CHEMICAL ENGINEERING PLANT COST INDEX**

1990	357.6	
1993	359.2	
Jun-99	392.3	estimate

**CAPITAL RECOVERY FACTOR (CRF) @f=10%,n=20:** 0.1175 cost of money 10%

			1999
<b>DIRECT ANNUAL COSTS, \$/YR</b>	<b>FACTOR</b>	<b>REFERENCE</b>	<b>COSTS, \$/YR</b>
OPERATING LABOR	\$27.82/HR @ 1HR/12HR(COT & EPA 1993b)	(EPA, 1993b)	\$20,309
SUPERVISORY LABOR	15 % OF OPERATING L	(EPA, 1993b)	\$3,046
MAINTENANCE LABOR AND MATERIALS	1,250 (MW) + 25,800	(EPA, 1993b)	\$137,392
CATALYST REPLACEMENT (CR)	N/A	Vendor Estimate	\$167,200
CATALYST DISPOSAL	\$15/CF	(EPA, 1993b)	\$20,520
AQUEOUS AMMONIA	\$378/ton	(EPA, 1993b)	\$590,765
DILUTION SYSTEM	N/A	(EPA, 1993b)	-
ELECTRICITY	N/A	(EPA, 1993b)	-
PERFORMANCE LOSS	0.50%	(EPA, 1993b)	\$19,320
BLOWER	N/A	(EPA, 1993b)	-
PRODUCTION LOSS	N/A	(EPA, 1993b)	-
			<b>\$958,553</b>
<b>INDIRECT ANNUAL COSTS, \$/YR</b>			
OVERHEAD	60% OF ALL LABOR M	(EPA, 1990d)	\$96,448
INSURANCE & ADMINISTRATION	2.5% OF TCI	(EPA, 1990d)	\$56,435
CAPITAL RECOVERY	CRF X (TCI - CR)	N/A	\$231,714
			<b>\$384,597</b>
<b>TOTAL ANNUAL COSTS, \$/YR</b>			<b><u>\$1,343,150</u></b>
<b>TOTAL NET NO<sub>x</sub> REDUCTIONS (TPY)</b>			
Oil Firing			0
Gas Firing			238
Total			<b>238</b>
<b>INCREMENTAL COST EFFECTIVENESS, \$/TON</b>			<b>\$5,643</b>

Assume same as NEPCO  
Assume same as NEPCO  
Assume same as NEPCO

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**Description:** Incremental and total cost analysis for the SCR System. Cost factors and references listed. Capital costs estimate for the SCR was supplied by a vendor **SCR-BACT to 6 ppm, Quote N**

**BACT ANALYSIS**

**CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION**

6 ppm

<b>COST ITEM</b>	<b>COST FACTOR</b>	<b>REFERENCE</b>	<b>COST (\$1999)</b>	
<b>DIRECT COSTS (DC)</b>				
<b>PURCHASED EQUIPMENT COSTS (PEC)</b>				
<b>SCR &amp; AUXILIARY EQUIPMENT</b>	<b>AS ESTIMATED, A</b>	<b>VENDOR QUOTE</b>	<b>\$3,372,917.00</b>	Twice the cost NEPCO Budgetary
INSTRUMENTATION	0.05 X A	(EPA, 1990d)	\$168,645.85	
STATE SALES TAXES	0.06 X A	State Sales Tax	\$202,375.02	
FREIGHT	0.05 X A	(EPA, 1990d)	\$168,645.85	
PEC SUBTOTAL	1.16 X A = B		<b>\$3,912,583.72</b>	
<b>DIRECT INSTALLATION COSTS (DIC)</b>				
FOUNDATIONS & SUPPORTS	0.08 X B	(ULRICH, 1984)	\$0.00	included in quote
LABOR	0.14 X B	(EPA, 1990d)	\$0.00	included in quote
ELECTRICAL	0.04 X B	(EPA, 1990d)	\$0.00	included in quote
PIPING	N/A	VENDOR QUOTE	-	
INSULATION	N/A	VENDOR QUOTE	-	
PAINTING	0.01 X B	(EPA, 1990d)	\$0.00	included in quote
DIC SUBTOTAL	0.27 X B	(EPA, 1990d)	<b>\$0.00</b>	
<b>SITE PREPARATION</b>				
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	<b>\$3,912,583.72</b>	
<b>INDIRECT COSTS (IDC)</b>				
ENGINEERING	0.10 X B	(EPA, 1990d)	\$0.00	included in quote
CONSTRUCTION OVERHEAD	0.05 X B	(EPA, 1990d)	\$0.00	included in quote
CONTRACTOR FEES	0.10 X B	(EPA, 1990d)	\$0.00	included in quote
CONTINGENCIES	0.03 X B	(EPA, 1990d)	\$391,258.37	final quote not in use 10%
START-UP	0.02 X B	(EPA, 1990d)	\$0.00	included in quote
PERFORMANCE TESTING	0.01 X B	(EPA, 1990d)	\$0.00	included in quote
TOTAL IDC	0.53 X B	-	<b>\$391,258.37</b>	
<b>TOTAL CAPITAL INVESTMENT (TCI)</b>	<b>1.84 X B</b>		<b>\$4,303,842.09</b>	

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**OPERATING COST FACTORS FOR SELECT CATALYTIC REDUCTION**

**COST DATA**

**CHEMICAL ENGINEERING PLANT COST INDEX**

1990. 357.6  
1993 359.2  
Jun-99 392.3

estimate 0.1175 cost of money 10%

**CAPITAL RECOVERY FACTOR (CRF) @f=10%,n=20:**

0.1  
20

**DIRECT ANNUAL COSTS, \$/YR**

	FACTOR	REFERENCE	1999 COSTS, \$/YR
OPERATING LABOR	\$27.82/HR @ 1HR/12HR	(COT & EPA 1993b)	\$20,309
SUPERVISORY LABOR	15 % OF OPERATING L	(EPA, 1993b)	\$3,046
MAINTENANCE LABOR AND MATERIALS	1,250 (MW) + 25,800	(EPA, 1993b)	\$137,392
CATALYST REPLACEMENT (CR)	N/A	Vendor Estimate	\$176,000
CATALYST DISPOSAL	\$15/CF	(EPA, 1993b)	\$21,600
AQUEOUS AMMONIA	\$378/TON	(EPA, 1993b)	\$621,858
DILUTION SYSTEM	N/A	(EPA, 1993b)	-
ELECTRICITY	N/A	(EPA, 1993b)	-
PERFORMANCE LOSS	0.50%	(EPA, 1993b)	\$19,320
BLOWER	N/A	(EPA, 1993b)	-
PRODUCTION LOSS	N/A	(EPA, 1993b)	-

Twice the amount for 15 ppm  
Twice the amount for 15 ppm  
Twice the amount for 15 ppm

**\$999,526**

**INDIRECT ANNUAL COSTS, \$/YR**

OVERHEAD	60% OF ALL LABOR M	(EPA, 1990d)	\$96,448
INSURANCE & ADMINISTRATION	2.5% OF TCI	(EPA, 1990d)	\$107,596
CAPITAL RECOVERY	CRF X (TCI - CR)	N/A	\$470,328

**\$674,372**

**TOTAL ANNUAL COSTS, \$/YR**

**\$1,673,898**

**TOTAL NET NOx REDUCTIONS (TPY)**

Oil Firing	0
Gas Firing	238
Total	238

**INCREMENTAL COST EFFECTIVENESS, \$/TON**

**\$7,033**



**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**Description:** Incremental and total cost analysis for the SCR System. Cost factors and references listed. Capital costs estimate for the SCR was supplied by a vendor. **SCR-BACT to 3.5 ppm, Quote F**

**BACT ANALYSIS**

**CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION**

<b>COST ITEM</b>	<b>COST FACTOR</b>	<b>REFERENCE</b>	<b>COST (\$1999)</b>	
<b>DIRECT COSTS (DC)</b>				
PURCHASED EQUIPMENT COSTS (PEC)				
SCR & AUXILIARY EQUIPMENT	AS ESTIMATED, A	VENDOR QUOTE	\$1,510,000.00	
INSTRUMENTATION	0.05 X A	(EPA, 1990d)	\$75,500.00	
STATE SALES TAXES	0.06 X A	State Sales Tax	\$90,600.00	
FREIGHT	0.05 X A	(EPA, 1990d)	\$0.00	Included
PEC SUBTOTAL	1.15 X A = B		\$1,676,100.00	
DIRECT INSTALLATION COSTS (DIC)				
FOUNDATIONS & SUPPORTS	0.08 X B	(ULRICH, 1984)	\$134,088.00	
LABOR	0.14 X B	(EPA, 1990d)	\$234,654.00	
ELECTRICAL	0.04 X B	(EPA, 1990d)	\$67,044.00	
PIPING	N/A	VENDOR QUOTE	-	
INSULATION	N/A	VENDOR QUOTE	-	
PAINTING	0.01 X B	(EPA, 1990d)	\$16,761.00	
DIC SUBTOTAL	0.27 X B	(EPA, 1990d)	\$452,547.00	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	\$2,128,647.00	
<b>INDIRECT COSTS (IDC)</b>				
ENGINEERING	0.10 X B	(EPA, 1990d)	\$167,610.00	
CONSTRUCTION OVERHEAD	0.05 X B	(EPA, 1990d)	\$83,805.00	
CONTRACTOR FEES	0.10 X B	(EPA, 1990d)	\$167,610.00	
CONTINGENCIES	0.03 X B	(EPA, 1990d)	\$50,283.00	
START-UP	0.02 X B	(EPA, 1990d)	\$28,522.00	5 days of support included in quote
PERFORMANCE TESTING	0.01 X B	(EPA, 1990d)	\$16,761.00	
TOTAL IDC	0.53 X B	-	\$514,591.00	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		\$2,643,238.00	

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**OPERATING COST FACTORS FOR SELECT CATALYTIC REDUCTION**

**COST DATA**

**CHEMICAL ENGINEERING PLANT COST INDEX:**

1990 357.6  
1993 359.2  
Jun-99 392.3

estimate

0.1175

cost of money 10%

**CAPITAL RECOVERY FACTOR (CRF) @f=10%,n=20:**

0.1

20

**DIRECT ANNUAL COSTS, \$/YR**

	FACTOR	REFERENCE	1999 COSTS, \$/YR
OPERATING LABOR	\$27.82/HR @ 1HR/12HR(COT & EPA 1993b)		\$20,309
SUPERVISORY LABOR	15 % OF OPERATING L	(EPA, 1993b)	\$3,046
MAINTENANCE LABOR AND MATERIALS	1,250 (MW) + 25,800	(EPA, 1993b)	\$137,392
CATALYST REPLACEMENT (CR)	N/A	Vendor Estimate	\$189,200
CATALYST DISPOSAL	\$15/CF	(EPA, 1993b)	\$23,220
AQUEOUS AMMONIA	\$378/ton	(EPA, 1993b)	\$668,498
DILUTION SYSTEM	N/A	(EPA, 1993b)	-
ELECTRICITY	N/A	(EPA, 1993b)	-
PERFORMANCE LOSS	0.50%	(EPA, 1993b)	\$19,320
BLOWER	N/A	(EPA, 1993b)	-
PRODUCTION LOSS	N/A	(EPA, 1993b)	-
			<b>\$1,060,985</b>

Scaled  
Scaled  
Scaled

**INDIRECT ANNUAL COSTS, \$/YR**

OVERHEAD	60% OF ALL LABOR M	(EPA, 1990d)	\$96,448
INSURANCE & ADMINISTRATION	2.5% OF TCI	(EPA, 1990d)	\$66,081
CAPITAL RECOVERY	CRF X (TCI - CR)	N/A	\$272,634
			<b>\$435,163</b>

**TOTAL ANNUAL COSTS, \$/YR**

**\$1,496,148**

**TOTAL NET NOx REDUCTIONS (TPY)**

Oil Firing	0
Gas Firing	269
Total	<b>269</b>

**INCREMENTAL COST EFFECTIVENESS, \$/TON**

**\$5,562**

# Attachment 4

## FOSTER WHEELER ENVIRONMENTAL CORPORATION EXCEL 5.0 CALCULATION SHEET

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**Description:** Incremental and total cost analysis for the SCR System. Cost factors and references listed. Capital costs estimate for the SCR was supplied by a vendor. LM 6000 PD Retrofit

### BACT ANALYSIS

#### CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION

COST ITEM	COST FACTOR	REFERENCE	COST (\$1999)	
<b>DIRECT COSTS (DC)</b>				
PURCHASED EQUIPMENT COSTS (PEC)				
Engine Upgrade	AS ESTIMATED, A	Engine Exchange	\$5,600,000.00	
Fuel System Mods		SSEP estimate	\$350,000.00	
PKG MODS & INSTRUMENTATION	0.05 X A	S&S Quote	\$1,200,000.00	
STATE SALES TAXES	0.06 X A	State Sales Tax	\$336,000.00	
FREIGHT	0.05 X A	(EPA, 1990d)	\$280,000.00	
PEC SUBTOTAL	1.16 X A = B		<b>\$7,766,000.00</b>	
DIRECT INSTALLATION COSTS (DIC)				
FOUNDATIONS & SUPPORTS	0.08 X B	(ULRICH, 1984)	\$0.00	included already
LABOR	0.14 X B	(EPA, 1990d)	\$0.00	inc
ELECTRICAL	0.04 X B	(EPA, 1990d)	\$0.00	inc
PIPING	N/A	VENDOR QUOTE	-	
INSULATION	N/A	VENDOR QUOTE	-	
PAINTING	0.01 X B	(EPA, 1990d)	\$0.00	
DIC SUBTOTAL	0.27 X B	(EPA, 1990d)	<b>\$0.00</b>	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	<b>\$7,766,000.00</b>	
<b>INDIRECT COSTS (IDC)</b>				
ENGINEERING	0.10 X B	(EPA, 1990d)	\$250,000.00	Optimizer
CONSTRUCTION OVERHEAD	0.05 X B	(EPA, 1990d)	\$0.00	
CONTRACTOR FEES	0.10 X B	(EPA, 1990d)	\$0.00	
CONTINGENCIES	0.03 X B	(EPA, 1990d)	\$232,980.00	
START-UP	0.02 X B	(EPA, 1990d)	\$155,320.00	
PERFORMANCE TESTING	0.01 X B	(EPA, 1990d)	\$77,660.00	
TOTAL IDC	0.53 X B	-	<b>\$715,960.00</b>	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		<b>\$8,481,960.00</b>	

**FOSTER WHEELER ENVIRONMENTAL CORPORATION  
EXCEL 5.0 CALCULATION SHEET**

By: RB Hook  
Date: 3/31/99  
Ckd. By:  
Date:  
Rev. By:  
Date:

OFS No.:  
File: COTBACT.XLS  
Sheet: SCR-BACT

**OPERATING COST FACTORS FOR SELECT CATALYTIC REDUCTION**

**COST DATA**

**CHEMICAL ENGINEERING PLANT COST INDEX**

1990 357.6  
1993 359.2  
Jun-99 392.3

estimate

0.1175

cost of money 10%

**CAPITAL RECOVERY FACTOR (CRF) @f=10%,n=20:**

0.1

20

**1999**

**DIRECT ANNUAL COSTS, \$/YR**

	<b>FACTOR</b>	<b>REFERENCE</b>	<b>COSTS, \$/YR</b>
OPERATING LABOR	\$27.82/HR @ 1HR/12HR	(COT & EPA 1993b)	\$0
SUPERVISORY LABOR	15 % OF OPERATING L	(EPA, 1993b)	\$0
MAINTENANCE LABOR AND MATERIALS	1,250 (MW) + 25,800	(EPA, 1993b)	\$0
CATALYST REPLACEMENT (CR)	N/A	Vendor Estimate	\$0
CATALYST DISPOSAL	\$15/CF	(EPA, 1993b)	\$0
AQUEOUS AMMONIA	\$360/TON	(EPA, 1993b)	\$0
DILUTION SYSTEM	N/A	(EPA, 1993b)	-
ELECTRICITY	N/A	(EPA, 1993b)	-
PERFORMANCE LOSS	0.50%	(EPA, 1993b)	-
BLOWER	N/A	(EPA, 1993b)	-
PRODUCTION LOSS	N/A	(EPA, 1993b)	\$288,000

No incremental cost

**\$288,000**

**INDIRECT ANNUAL COSTS, \$/YR**

OVERHEAD	60% OF ALL LABOR M	(EPA, 1990d)	\$0
INSURANCE & ADMINISTRATION	2.5% OF TCI	(EPA, 1990d)	\$212,049
CAPITAL RECOVERY	CRF X (TCI - CR)	N/A	\$996,288

**\$1,208,337**

**TOTAL ANNUAL COSTS, \$/YR**

**\$1,496,337**

**TOTAL NET NO<sub>x</sub> REDUCTIONS (TPY)**

Oil Firing	0
Gas Firing	125
Total	<b>125</b>

**INCREMENTAL COST EFFECTIVENESS, \$/TON**

**\$11,971**

**GE Industrial AeroDerivative  
Gas Turbines**

GE Power Systems,  
One Neumann Way, S158  
Cincinnati, OH 45215-1986  
Phone: (513) 552-5925  
Fax: (513) 552-5069

June 25, 1999

Mr. Wade Smith  
Orange Cogeneration Limited Partnership  
Lakeland, FL

Dear Mr. Smith

The purpose of this letter is to clarify GE's position with respect to contractual agreement and emissions permit levels at the Orange Cogeneration facility at Bartow.

According to the settlement agreement executed between GE and OCLP on 3-11-97 GE is contractually obligated to "correct the engines" or "implement alternate technology" to meet air permit requirements of 15ppmvd (15% O<sub>2</sub>). As you know, GE has been working in good faith to honor this obligation.

However, during two meetings that GE has participated in with CSW and the Florida Department of Environmental Protection (FL-DEP), the FL-DEP has suggested that, in the event SCRs are required to meet permit requirements that the state reserves the right to impose even tighter restrictions on NO<sub>x</sub> concentrations on the Bartow plant.

GE views such tighter restrictions as requirements above and beyond the contractual agreement between OCLP and GE. As such, we are requesting that any SCR system suppliers provide separate quotes for incremental costs which reflect exhaust treatment beyond GE's 15 ppm obligation. Before proceeding with any system modifications, GE and OCLP will need a formal agreement whereby OCLP clearly has responsibility for incremental costs stemming from changes in permit level which drive exhaust emissions permit levels to less than 15 ppm.

Regards,

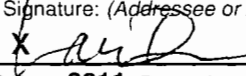
RB Hook

Mgr, LM6000 Technical Programs

cc: B. Kaye, R. Felini

Fold at line over top  
the right of the

Is your RETURN ADDRESS completed on the reverse side?

<b>SENDER:</b> ■ 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): 1. <input type="checkbox"/> Addressee's Address 2. <input type="checkbox"/> Restricted Delivery Consult postmaster for fee.
3. Article Addressed to: Mr. Wade Smith, Gen. Mgr. Orange Cogen, LP 1125 US Hwy 98 S. Lakeland, FL 33801	4a. Article Number Z 333 618 201	
	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 7-22-99	
5. Received By: (Print Name)	8. Addressee's Address (Only if requested and fee is paid)	
6. Signature: (Addressee or Agent) 		

Thank you for using Return Receipt Service.

PS Form 3811, December 1994

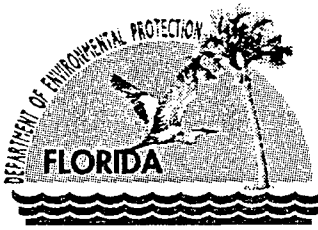
102595-98-B-0229 Domestic Return Receipt

Z 333 618 201

US Postal Service  
**Receipt for Certified Mail**  
 No Insurance Coverage Provided.  
 Do not use for International Mail (See reverse)

Sent to	Wade Smith
Street & Number	Orange Cogen
Post Office, State, & ZIP Code	Lakeland FL
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	7-20-99
	1050231

PS Form 3800, April 1995



Jeb Bush  
Governor

# Department of Environmental Protection

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

David B. Struhs  
Secretary

July 19, 1999

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. Wade Smith, General Manager  
Orange Cogeneration Limited Partnership  
1125 US Highway 98 South, Suite 100  
Lakeland, Florida 33801

Re: Orange Cogeneration Facility, ARMS ID No. 1050231  
Re-Evaluation of Best Available Control Technology (BACT) for NO<sub>x</sub>

Dear Mr. Smith:

On June 28, 1999, the Department received your request for a determination on the economic feasibility of installing Selective Catalytic Reduction (SCR) on the existing General Electric LM6000PB gas-fired combined cycle combustion turbines. Based on the information available to the Department, including your letter, the Department has determined that Orange Cogen will need to install SCR on these units. The key factors in making this determination are:

- The units presently operate under and comply with an initial nitrogen oxides (NO<sub>x</sub>) permit emission limit of 25 ppmvd @ 15 percent oxygen.
- The units were to have achieved a Best Available control Technology (BACT) limit of 15 ppmvd by January 1, 1998.
- After December 31, 1999, the maximum NO<sub>x</sub> concentration, 1-hour average, from each CT/HSRG unit, shall not exceed 15 ppmvd @ 15% O<sub>2</sub>, as determined by the procedures in Specific Conditions Nos. 16, 17 and 18. The permittee shall obtain prior approval from the Department for any air pollution control equipment not addressed in this permit that is needed to meet the NO<sub>x</sub> emission standard. The Department may revise the limit based on the capabilities of alternative equipment installed.<sup>1</sup>
- GE had provided reasonable assurance that it would meet the compliance date through its research and development efforts. They now report that the technology barrier will not allow achievement of 15 ppmvd @ 15% oxygen by Dry Low-Emissions (DLE) technology alone.
- NO<sub>x</sub> control by XONON™ technology was rejected by Orange Cogen as not commercially available. The Department confirmed that GE and Catalytica have no plans for applying the XONON™ controls to the line of aeroderivative gas turbines. However, plans are under way to evaluate this technology on the larger GE Frame 7EA and 7FA units.
- SCONOX™ technology was rejected by Orange Cogen as not demonstrated for this size gas turbine and having limited commercial availability.
- Replacement of the LM6000PB units with derated LM6000PD units was rejected by Orange Cogen as not economically feasible.

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

*Printed on recycled paper.*

- Economic analyses were presented based on three different levels of NO<sub>x</sub> control with SCR: 3.5, 6.0, and 15.0 ppmvd @ 15% oxygen. The estimates ranged from \$5,500 to 12,000 per ton removed.

Based on the information provided, the Department does not believe the cost effectiveness for SCR to be prohibitive to the applicant considering that GE "is contractually obligated to correct the engines or implement alternate technology to meet air permit limits of 15 ppmvd."<sup>2</sup> The Department is also aware that other companies have installed SCR on both simple and combined cycle LM6000 units<sup>3,4,5</sup>.

We understand you are obtaining actual bids. We will be happy to discuss with you the minimum requirements for submitting a complete application. An extension of the compliance date can be considered to provide time to install and test a properly designed system.

We received a late E-Mail from GE regarding simulations incorporating Spray Intercooling (SPRINT) technology to accomplish power and emissions improvements. There will be a demonstration in the first half of 2000. The description does not (yet) provide reasonable assurance that SPRINT will actually result in achievement of 15 ppmvd and it would obviously cause at least a further year-long extension of the 25 ppmvd limit.

If you have any additional questions, please contact Al Linero at 850/921-9523 or Jeff Koerner at 850/414-7268.

Sincerely,



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

cc: Gregg Worley, EPA  
Don Shepherd, NPS  
C. St. Cin, Foster Wheeler Environmental Corporation  
R.B. Hook, GE AeroDerivative  
D. Oehring – CSWE Operations Orange Cogeneration

## References

- <sup>1</sup> Permit Condition 11. DEP File No. 1050231-003-AC (PSD-FL-206C). Permit Modification Orange Cogen. December, 1998.
- <sup>2</sup> Letter. Hook, R.B., GE to Smith, W., Orange Cogen. GE's Position with respect to Contractual Agreement. June 25, 1999.
- <sup>3</sup> Permit. Texas Air Resources Board Permit No. 37984 for Lubbock Power & Light. Two LM6000<sup>®</sup>C units with a NO<sub>x</sub> limit of 9 ppmvd @ 15% oxygen controlled with SCR.
- <sup>4</sup> Article. "LP&L Begins the LM6000 Sprint." Power Engineering. November 1998.
- <sup>5</sup> Document. Guidance for Power Plant Siting and BACT. California Air Resources Board. June, 1999.





RECEIVED

OCT 25 1999

BUREAU OF AIR REGULATION

Clair H. Fancy, P.E.  
Chief, Bureau of Air Regulation  
Florida Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, FL 32399

RE: Orange Cogeneration Limited Partnership  
Permit No. PSD-FL-206/1050231-002-AC  
Nitrogen Oxides Requirements  
Request for Permit Modification

1050231-002-AC  
PSD-FL-206(c)

Dear Mr. Fancy:

Thank you for meeting with representatives from Orange Cogeneration Limited Partnership (Orange Cogeneration) and General Electric Corporation (GE) in September regarding possible nitrogen oxides (NOx) controls for the Orange Cogeneration facility in Polk County. We appreciate your openness to consider GE's newest NOx control strategies for the LM6000 series of industrial aeroderivative gas turbines. As promised during our meeting, we have enclosed documentation from GE regarding its current schedule for development of these new inlet water injection technologies (Sprint™ and selective water injection).

As we discussed at our recent meeting, Orange Cogeneration would like to obtain Department approval of these new technologies with a further extension of the compliance deadline for the targeted NOx emission rate of 15 ppm. In addition, Orange Cogeneration respectfully requests that the Department revise the PSD permit to reflect that the 25 ppm limit for NOx is appropriate as Best Available Control Technology (BACT) if these new technologies should fail to achieve 15 ppm (with a margin for compliance and possible degradation over time).

Please accept this letter as Orange Cogeneration's formal request, pursuant to Rule 62-4.080(3) and Rule 62-212.400, FAC., to amend Orange Cogeneration's PSD permit (PSD-FL-206) (as amended on August 25, 1997 and December 18, 1998) to extend the date for compliance with the NOx emission limit of 15 ppm and to provide that the NOx emission limit will be established at 25 ppm in the event the new technology is unable to achieve the lower limit. Enclosed is a check in the amount of \$250 made payable to the Department as the fee for this request. The requested permit modifications to the modified permit are as follows:

Clair H. Fancy, P.E.  
Chief, Bureau of Air Regulation  
Florida Department of Environmental Protection  
October 11, 1999  
Page 2

#### Under Modified Specific Condition

- #8 Add to the list of control technologies to control NO<sub>x</sub> emission: "using dry low NO<sub>x</sub> or wet injection technologies ~~technology~~ to control NO<sub>x</sub> emissions."
- #10 Change the compliance date from "Prior to January 1, 1999," to "Prior to September 1, 2001".
- #11 Change compliance date to "After August 31, 2001," instead of "After December 31, 1998". Insert a new sentence: "Should the NO<sub>x</sub> standard of 15 ppm @ 15% O<sub>2</sub> not be achieved during the initial compliance tests (with a reasonable margin for compliance and degradation over time), the NO<sub>x</sub> emission limit for this facility shall be 25 ppm @ 15% O<sub>2</sub>."
- #15 Change review date from "...review by January 1, 1998." to "...review by September 1, 1999."
- Table 1 Change the compliance date in the body of the table and in note (d) to "9/1/01" instead of "1/1/99". Insert a new sentence in note (d) to read: "Should the NO<sub>x</sub> standard of 15 ppm @ 15% O<sub>2</sub> not be achieved during the initial compliance tests (with a reasonable margin for compliance and degradation over time), the NO<sub>x</sub> emission limit for this facility shall be 25 ppm @ 15% O<sub>2</sub>." Also, add wet injection technology to note (e) and to the "Control" column in the table.

As explained in GE's letters to Orange Cogeneration dated October 7, 1999, copies of which are attached, these new water injection technologies being proposed for the Polk County facility offer lower NO<sub>x</sub> emissions with minimal environmental, energy and economic impacts, especially when compared to a selective catalytic reduction (SCR) system. While these water injection systems rely on a well-demonstrated approach to minimizing NO<sub>x</sub> emissions by reducing the combustor flame temperature, full-scale implementation is not expected to be available until the third quarter of 2001. Orange Cogeneration believes that it is reasonable to continue to pursue these technologies for its facility in an effort to meet the targeted rate of 15 ppm for NO<sub>x</sub> and requests that the Department authorize the use of these technologies. Because of the time needed by GE for further testing, development, and full-scale implementation, Orange Cogeneration also respectfully requests that the compliance deadline for achieving the 15 ppm NO<sub>x</sub> rate be extended from January 1, 2000 to September 1, 2001.

Clair H. Fancy, P.E.  
Chief, Bureau of Air Regulation  
Florida Department of Environmental Protection  
October 11, 1999  
Page 3

While GE and Orange Cogeneration have made every effort to achieve NOx rates of 15 ppm on the Polk County units using dry low NOx combustion technology (including an expenditure of over \$20 million by GE in pursuit of lower NOx rates on LM6000 machines), it appears that

combustion technology alone will be insufficient to achieve rates this low on a long-term basis. We would therefore appreciate your consideration of these water injection technologies as a reasonable alternative to achieve the targeted rate. In support of its request, and in response to some of the issues raised in the Department's July 19, 1999 letter, Orange Cogeneration offers the following.

**Implementation of BACT:** When the BACT determination was originally made, the Department apparently relied on available information from existing combustion turbines that had demonstrated the achievability of NOx levels in the range of 25 ppm. Relying on vendor guarantees and advances made with other types of combustion turbines such as Frame 7EA's and 7F's (but not LM6000's), the Department's determination found that NOx levels of 15 ppm should be achievable in the future using dry low NOx combustion technology. The permit therefore reflected a NOx limit of 25 ppm that would be reduced to 15 ppm at a point in the future, with both limits to be achieved using dry low NOx combustion technology unless a different technology were approved by the Department. Even though significant advances were made in lowering NOx levels on other types of combustion turbines and despite its best efforts, GE has been unable to reach consistent NOx levels at or below 15 ppm with the LM6000 aeroderivative gas turbines due to a technology barrier. To implement the current BACT, Orange Cogeneration therefore proposes to utilize water injection technology, as described in the attached documentation from GE and as we discussed at our meeting in September. With the information provided, we trust that the Department will have sufficient reasonable assurance that GE's technology will achieve the targeted levels. If additional information is needed, please let us know.

The use of this alternative water injection technology should be considered as implementation of the original BACT determination, consistent with prior actions by the Department. For example, in a similar situation, the Department found low-NOx burner technology to be BACT and established a certain emission rate in the original determination; the Department later authorized an SCR system to be installed as an implementation of the BACT to meet the original limit. That facility's permit specifically stated that the Department's approval of the alternative technology was not subject to PSD review. (PSD-FL-195A, Florida Power Corporation, Condition B.1.i). Similarly, Orange Cogeneration's use of a water injection technology should be considered an implementation of the original BACT and should not trigger a reopening of the determination.

Clair H. Fancy, P.E.  
Chief, Bureau of Air Regulation  
Florida Department of Environmental Protection  
October 11, 1999  
Page 4

**Target Rate of 15 PPM:** The Department should revise the permit to reflect that the 25 ppm limit is appropriate as BACT if the water injection system fails to achieve the targeted rate, notwithstanding GE's concerted effort that has a reasonable potential for success. While the target rate of 15 ppm was placed in the permit as part of the BACT determination based on a vendor guarantee (limited to initial operation only), it was not a demonstrated technology at the time. While there have been significant attempts to reduce NOx emissions to achieve levels at or

below 15 ppm using dry low NOx combustion technology in recent years, NOx rates at this low level have not been demonstrated on this type of unit using combustion controls alone.

The original BACT determination found that the use of an SCR system to achieve NOx levels of 15 ppm was not justified based on economic and environmental factors, and this holds true today. As indicated in our June 25, 1999 submittal, incremental costs to achieve levels of 15 to 3.5 ppm of NOx using SCR are currently in the range of \$5,562 to \$11,971 per ton removed, which are not reasonable or cost-effective based on previous Department determinations. While the Department stated in its July 19, 1999 letter that the costs *were* reasonable because GE was contractually liable for a portion of the SCR costs, the costs are nevertheless being incurred by someone and neither the Department's rules nor federal guidance provides that costs paid or assumed by a third party are to be disregarded in a BACT analysis. The contractual arrangement between GE and Orange Cogeneration is not relevant for consideration in the cost analysis--the incremental cost-benefit analysis appropriately considers the *full* costs of an SCR system regardless of who may pay for the system, its components, or its operation. Even considering GE's contractual obligations, however, a significant portion of the costs including ammonia supply, certain capital costs (e.g., related to catalyst sizing), catalyst maintenance and replacement, and other continuing operating and maintenance costs will be incurred by Orange Cogeneration for the life of the project. Orange Cogeneration therefore requests that the Department revise the permit to reflect that the BACT limit is appropriately 25 ppm if the water injection technologies fail to achieve the targeted rate of 15 ppm.

**Reopening of BACT:** There is no basis at this time for the Department to reopen the original BACT determination to lower the NOx emission rate below 15 ppm. While a 1985 draft EPA guidance document provides that BACT should be reconsidered when a facility requests an extension of the 18-month period within which to commence construction, the extensions requested by Orange Cogeneration have been compliance-related and not tied to construction. Once a unit has been constructed, as the Orange Cogeneration facility has, federal guidance provides that BACT should be reopened only where a modification is triggered or a significant revision causing an increase in emissions is being requested. Because Orange Cogeneration has

Clair H. Fancy, P.E.  
Chief, Bureau of Air Regulation  
Florida Department of Environmental Protection  
October 11, 1999  
Page 5

not triggered a modification and is not proposing a change in operations that would increase emissions, it is inappropriate to reopen the BACT determination or consider imposing a lower emission rate.

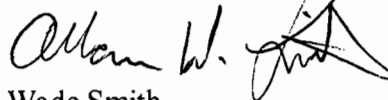
In summary, Orange Cogeneration formally requests that the Department amend PSD FL-206 to authorize the use of water injection technology to meet the targeted NOx level of 15 ppm (assuming an appropriate margin for compliance and degradation over time) by September 1, 2001, and that the Department also revise the permit to reflect that the appropriate BACT limit for NOx is 25 ppm if, despite best efforts, the facility is unable to achieve the targeted lower NOx

levels using water injection technology in conjunction with the existing dry low emissions controls. The requested revised language of the PSD permit is set forth above.

Orange Cogeneration appreciates your consideration of this request to revise the PSD permit. We also request a meeting at your earliest convenience to further discuss this matter in greater detail. If you have any questions in the meantime, please call me at (941) 682-6338.

Sincerely,

ORANGE COGENERATION LIMITED PARTNERSHIP  
By: Orange Cogeneration GP, Inc., its General Partner



Wade Smith  
General Manager

Enclosure

cc: Al Linero, DEP BAR  
Bill Proses, DEP SWD ✓  
Gregg Worley, EPA ✓  
Ellen Porter, NPS ✓  
R. B. Hook, GE Aeroderivative  
D. Oehring, CSWE Operations Orange Cogeneration

cc: M. Halpin, BAR  
Pelk Co.



GE Power Systems.  
One Neumann Way, S158  
Cincinnati, OH 45215-1988  
Phone: (513) 552-5925  
Fax: (513) 552-5059

October 18, 1999

Orange Cogeneration Limited Partnership  
1125 US 98 South, Suite 100  
Lakeland, FL 33801

Attn: Wade Smith

The purpose of this letter is to document two new technical alternatives that have the potential to achieve the desired emission levels of 15 ppm NO<sub>x</sub> without the use of exhaust treatment. The new alternatives are:

- Application of Sprint™ technology
- Use of selective H<sub>2</sub>O injection into the combustor

These alternatives were presented to the Florida Department of Environmental Protection (DEP) in a meeting held September 2, 1999. A copy of that presentation is attached for reference.

## **Background**

During the last six months, GE evaluated various alternatives to meeting the contractual agreements with Orange Cogeneration Limited Partnership (OCLP) regarding gas turbine NO<sub>x</sub> emissions. These were documented in a 6-25-99 letter from OCLP to FL-DEP.

Technically viable alternatives evaluated included SCR and derated LM6000PD. Of these, SCR was the more cost effective.

About the same time (June 1999) GE conducted some additional measurements which suggested that the needed NO<sub>x</sub> improvements could likely be achieved via small amounts of H<sub>2</sub>O injection using Sprint™ technology and/or by selectively injecting H<sub>2</sub>O into certain areas of the combustor. GE disclosed this work to the FL-DEP in early July and made a technical presentation on Sept. 2 at Tallahassee.

The advantages of using "damp" technology over SCR are as follows:

- Provides lower total emissions to atmosphere (when ammonia slip is considered).
  - An SCR with 10 ppm ammonia slip will add an additional 48 ton per year of NH<sub>3</sub>. For the two gas turbines at the plant. Additional introduction of ammonia into the atmosphere is a concern since it could potentially lead to increased O<sub>2</sub> consumption by algae in sensitive water areas causing fishkills or other degradation of the environmental ecosystems.
  - Therefore damp technology would avoid 48 ton per year of additional emissions.
- Avoids visible haze emissions associated with ammonia slip
- Avoids possible complaints of odor due to ammonia
- Reduces operating costs
  - Ammonia costs
  - Catalyst replacement costs
  - Catalyst disposal costs
  - Gas turbine performance losses due to SCR back pressure
- Avoids additional opportunity for “fugitive” ammonia release and impacts to nearby residential areas due to transportation, handling and storage

This memo provides the technical rationale and proposal to pursuing “damp” technology to capitalize on the aforementioned benefits.

## SPRINT™ Technology

Tests were conducted at the OCLP facility at Bartow, Florida that included injecting a water mist into the engine inlet. The tests were conducted at high power operating conditions and the water injection rate was approximately 5 gallons per minute. Figures 1 and 2 show the results of these tests for the two different engines at the site. These figures show how NO<sub>x</sub> emissions vary as a function of power with and without water injection into the engine inlet. With water injection NO<sub>x</sub> emissions were lower by approximately three ppm at a given power level. The results were nearly identical on both of the engines at the site.

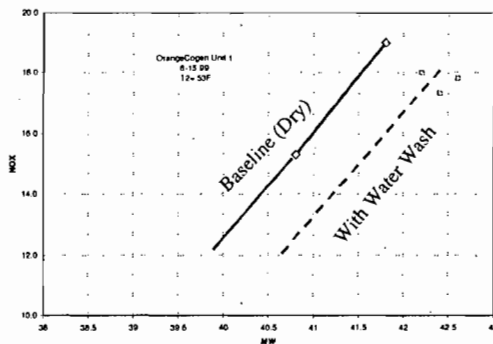


Figure 1  
SPRINT Results on Unit #1

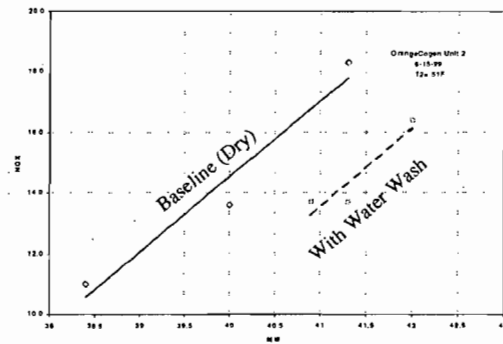


Figure 2  
SPRINT Results on Unit #2

What is significant in these results is that data obtained during the tests indicate that the NOx permit level of 15 PPM was *nearly achieved* on both engines at rated power. In fact, NOx levels of 15.5 and 16.0 PPM were recorded on units one and two, respectively.

This demonstration was conducted using a crude water mist injection system that is normally used to clean the engine inlet, which is known to produce a circumferentially non-uniform water mist. This is significant in two respects. First, it can be expected that a system that provides more uniform injection will also provide lower emission levels. Second, the demonstrator system used for the tests is not suitable for long term operation. GE is currently developing a system for the LM6000 PC that should provide a uniform injection pattern. This system will be developed and demonstrated during fourth quarter 1999. This system would then have to be adapted for use on the LM6000PB models at OCLP.

## **Selective Water Injection**

### **Major factors driving and NOx emissions on LM6000PB**

The LM6000PB combustor is a triple annular design in which there are three concentric burning zones called domes. At high power operating conditions all three combustor domes are lit. Also, at these conditions all engine bleeds are closed and the control mode is called "throttle push". In throttle push control mode the flame temperatures in the inner and outer domes ("C" and "A" domes) are regulated to a control schedule that is determined by combustor acoustic boundaries. As power is increased, inner and outer dome flame temperatures are regulated to preset temperatures and any additional fuel flow required to achieve power is fed to the center dome ("B" dome).

Therefore, during throttle push control mode, the B dome temperature increases as power is increased. The NOx also increases as power is increased.

Statistical evaluation of NOx emissions during these operating conditions has verified that the B-dome flame temperature is the main NOx production driver. *Therefore, control of the B dome flame temperature is the primary key to achieving low NOx on the LM6000.*

Previously, the strategy that was being pursued to lower NOx emissions was to add more air to this dome. While high flow premixers achieved some success in reducing NOx by adding air to the B dome, there were several factors which limited the amount of air which could be added to this dome. These included issues relative to idle operation and turbine cooling.



## Method for controlling B dome temperature

The Sprint™ feasibility data was encouraging in that water could be added into the engine system without increasing combustor acoustic activity.

This suggests that low levels of water or steam could be introduced into the B dome region of the combustor thereby reducing temperatures and suppressing NO<sub>x</sub> generation. By so doing, it should be possible, at the OCLP facility rating condition, to duplicate flame temperatures at the minimum NO<sub>x</sub> point thereby achieving the lowest possible NO<sub>x</sub> emissions from these gas turbines. The current LM6000s at the OCLP plant have produced NO<sub>x</sub> emissions levels in the range of the 12-13 ppm at the minimum NO<sub>x</sub> point. GE believes that, with the use of water or steam injection, levels below 15 ppm may be achieved at the rated conditions for OCLP.

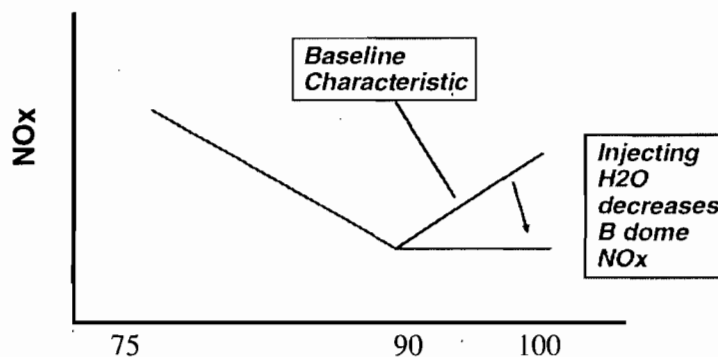


Figure 3 Impact of H<sub>2</sub>O Injection on NO<sub>x</sub> Emissions Characteristic

Figure three (above) shows how water or steam injection could potentially flatten out the NO<sub>x</sub> versus power characteristic and high power. This could also benefit the degradation characteristics of the engine. As fuel flow increases are required to maintain power as the units performance degrades between major maintenance repair cycles, resulting B dome temperature increases can conceivably be offset by water flow increases.

## Technology demonstration plan

GE proposes to demonstrate this technology using an existing dual fuel dry low emissions premixer design. Water or steam will be introduced into the B-dome of the combustor using the liquid passages in the dual fuel premixer.

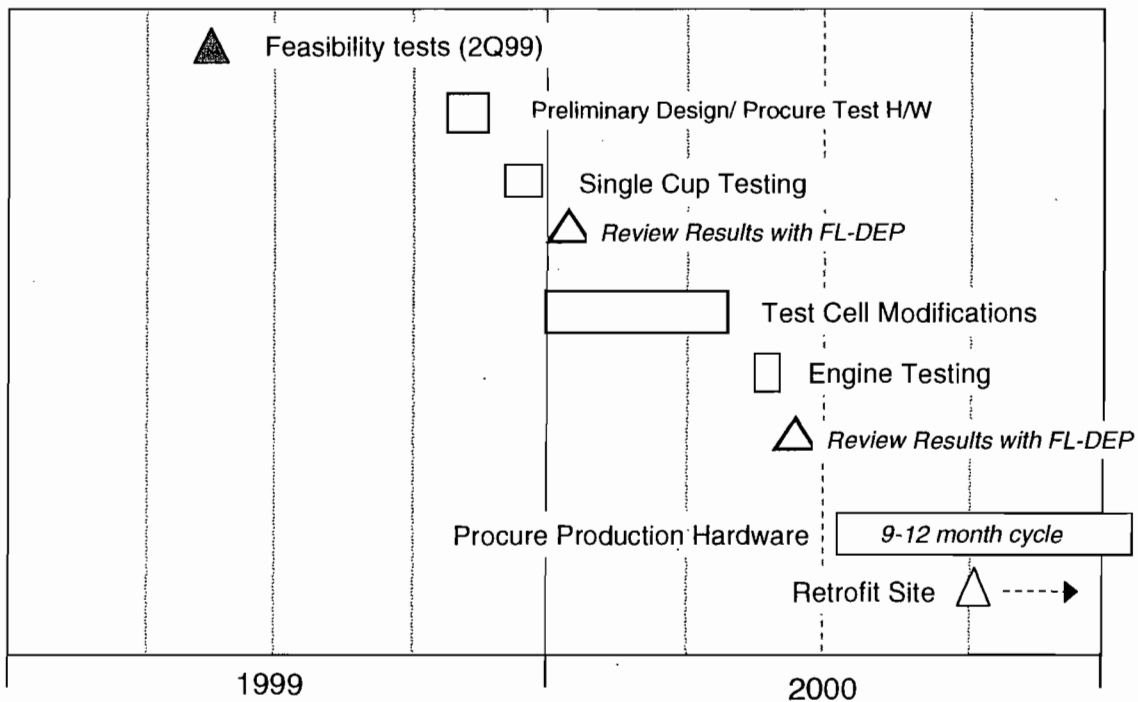
The first element of the program will be to conduct a single test in a combustor rig to determine lean blow out characteristics and flame stability with water and steam

injection. This test will determine whether water or steam is the best alternative for achieving the B dome NOx suppression.

After a determination is made whether water or steam is the best alternative, an engine demonstration test will be undertaken, in GE's engine test facility. The outcome of the engine test will determine if selective water injection, or SPRINT™, or if some combination of the two approaches provides the best solution. It should be noted that the selective water injection system, by itself, may satisfy contract requirements and, in that event, GE reserves the right to implement this system solely as a resolution to this contract. The test will also determine if there are any technology issues, such as acoustic boundaries or CO emissions, that will require further development.

The availability of hardware and the modification of the test cell for water injection and SPRINT™ operation will pace this test. The engine test will be complete no later than the end of June 2000. At that time, a technical review will be conducted with the FL-DEP and a determination made as to whether this approach is practical for commercialization. A preliminary milestone chart is provided below.

## ***Water Injection Program Schedule***



If the wet injection scheme is shown to be feasible, GE intends to proceed with design and procurement of a production quality system to be installed at the OCLP facility. The cycle time will depend on whether there are changes required to the

fuel nozzles, however it is expected that this could be accomplished by end June 2001.

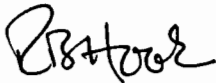
If, on the other hand, it is determined that this technology is not capable of achieving the permit levels at the OCLP plant, installation of selective catalytic reduction systems can be pursued to address the emissions limit. GE is working very closely with an SCR supplier to make commercial arrangements for this scenario.

### Summary

We believe that pursuing the proposed technology demonstration plan will lead to a system solution which has many environmental benefits over SCR, will be a favorable alternative in terms of net plant profitability for OCLP due to lower on-going operating costs when compared to SCR, and will also advance the state of the art in emissions technology for the LM6000 AeroDerivative gas turbine

Based on our discussion in Tallahassee earlier this month, we are optimistic that the regulatory agencies and other concerned parties will find value in these advantages and provide a permit extension to mid-2001 to allow us to demonstrate this technology and implement it at the site.

Best regards,



RB Hook  
LM6000 Technical Program Mgr.  
GE Industrial Aeroderivative Gas Turbines

Concurred:



Bob Ausdenmoore  
Systems Engineer  
GE Industrial Aeroderivative Gas Turbines





**GE Industrial AeroDerivative  
Gas Turbines**

GE Power Systems.  
One Neumann Way, S158  
Cincinnati, OH 45215-1988  
Phone: (513) 552-5925  
Fax: (513) 552-5059

October 7, 1999

Orange Cogeneration Limited Partnership  
1125 US 98 South, Suite 100  
Lakeland, FL 33801

Attn: Wade Smith

I have been intimately involved in the development of the Dry Low Emissions (DLE) Combustion Technology for the GE LM engines in the past 9 years. I have published 3 peer-reviewed papers describing this technology and have about 15 patents.

I have reviewed the attached technical approach of utilizing inlet water injection (SPRINT) as well as the limited injection of water or steam in the pilot dome to achieve lower NOx emissions. This is a logical approach in that the flame temperature is reduced by both of these approaches. It is well known in the industry that reduction of the combustor flame temperature will lead to reduced NOx emissions. The concept will need to be developed beyond a simple demonstration to ensure that a sufficient margin exists between the demonstrated capability and emissions regulations. Combustor dynamics and operating maps will have to be generated and validated.

The plan calls for demonstration of NOx reduction by injection of water in the pilot dome using a well-developed and characterized single cup/module test rig. Once an acceptable NOx reduction has been demonstrated the decision to proceed with an engine test can be taken. The engine test will help generate operating parameters, and maps for the enhancement of the DLE technology.

In summary, the approach to NOx reduction is practical. The development program, laid out by the team, is logical and has a reasonable potential for success.

Sincerely,

Narendra Joshi, PhD.  
Product Development Program Mgr  
GE Industrial Aeroderivative Gas Turbines



## GE Industrial Aerodervative Gas Turbines

# Orange Cogeneration 15 PPM Emissions Attainment Program

RB Hook GE-IAD Technical Program Mgr.

Eric Kress GE-IAD Systems Engineer

9/2/99

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## Agenda

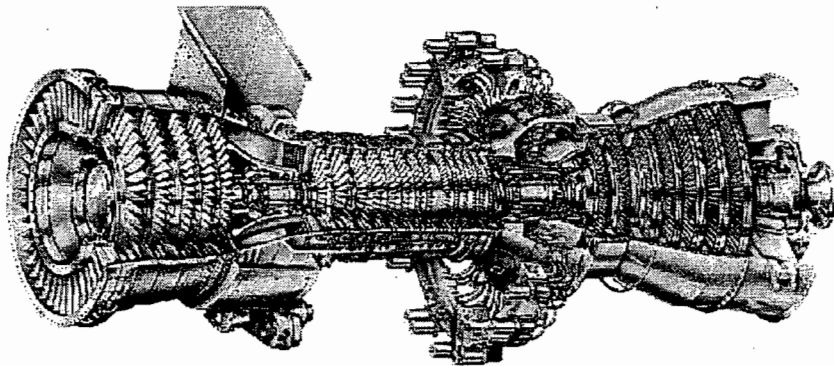
- Review of LM6000 System
- Results of SPRINT™ Feasibility Testing at Bartow
- Selective Water Injection Concept - Damp Low Emissions
- Program Plan
- Conclusion

Job ID/date/2

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GE Aircraft Engines

## LM6000 Dry Low Emissions Systems



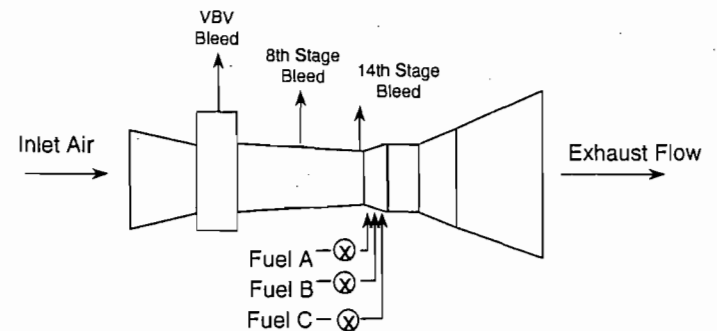
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## GE - IAD Approach to Dry Low Emissions

- Combination of fuel and air staging: Required for premix operation from start to full power
- Triple annular combustor: Compact, minimal cooling air required, and facilitates fuel staging



Job ID/date/4

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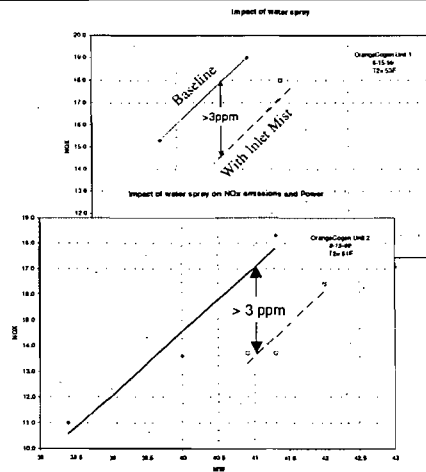
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## Sprint Testing Conducted on Bartow Units

### Inlet water injection testing

- 3ppm reduction @ constant power
- 15.5 ppm @ Orangeco guarantee level
- 0.9-1.3 MW power increase @ constant NOx

Water wash injection system known to produce nonuniform spray



**SPRINT™ test reduced NOx 3ppm on Orange Cogen engines - Demonstrated 15 PPM / 16 PPM at rated power**

Job ID/date/5

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## SPRINT™ Testing - Conclusions

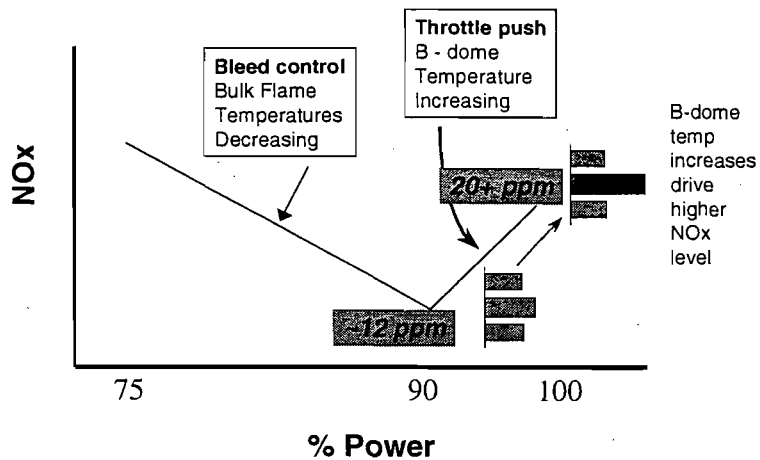
- Testing nearly achieved 15 ppm at rated power
- Improvements can be anticipated with production SPRINT™ system
  - Spray distribution
  - Atomization
- Margin for deterioration an issue

Job ID/date/6

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## NOx Characteristics of Triple Annular Combustor

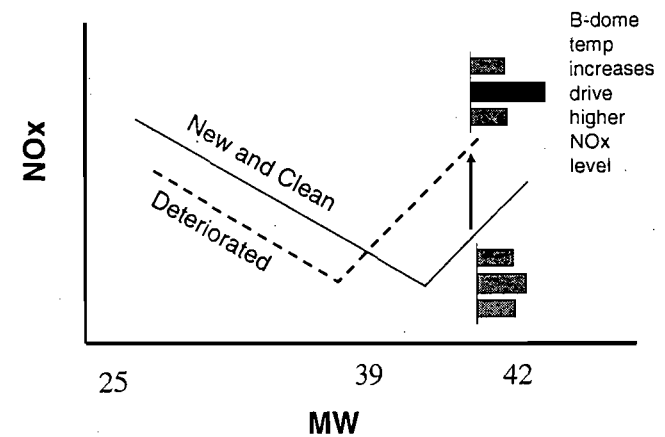


Job ID/date/7

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GE Aircraft Engines

## Deterioration and NOx emissions



Job ID/date/8

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GE Aircraft Engines

## Selective Injection - Strategy & Objectives

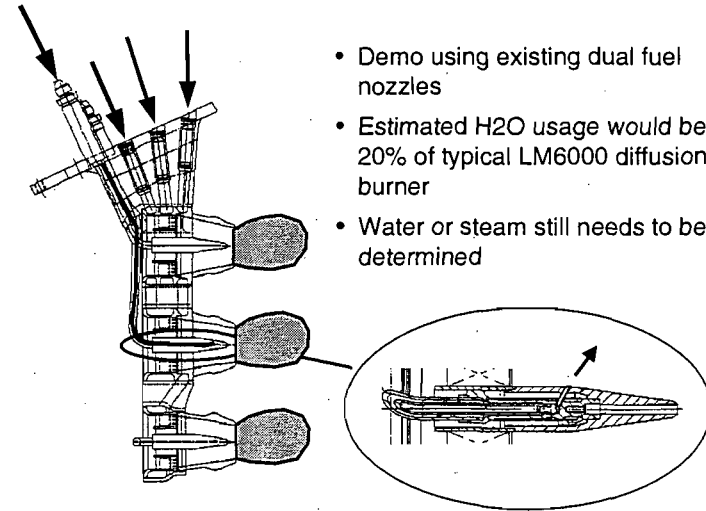
- “Manage” B dome temperatures
- Achieve entitlement level on NOx
- Offset deterioration

Job ID/date/9

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GE Aircraft Engines

## Selective Injection



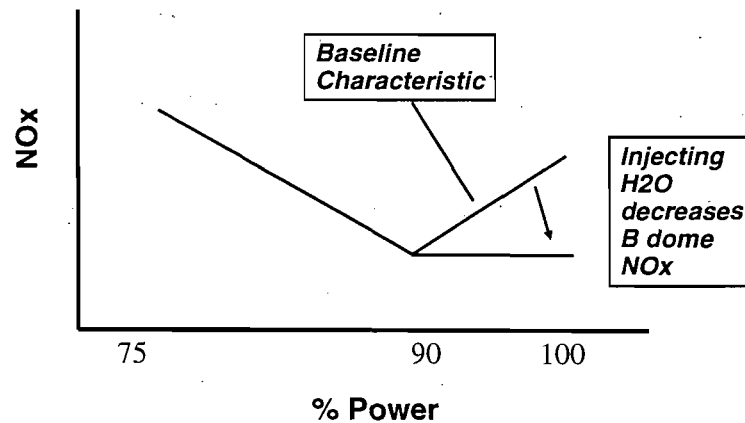
- Demo using existing dual fuel nozzles
- Estimated H<sub>2</sub>O usage would be 10-20% of typical LM6000 diffusion burner
- Water or steam still needs to be determined

Job ID/date/10

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GE Aircraft Engines

## NOx Characteristics of Triple Annular Combustor with selective H<sub>2</sub>O injection

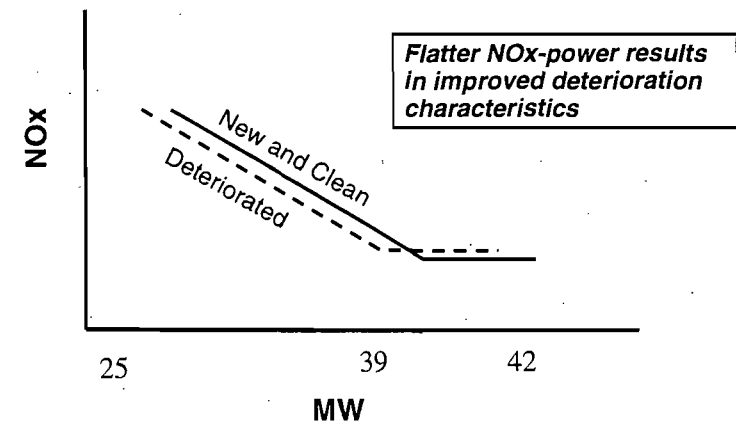


Job ID/date/11

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GE Aircraft Engines

## Deterioration and NOx with Selective H<sub>2</sub>O Injection

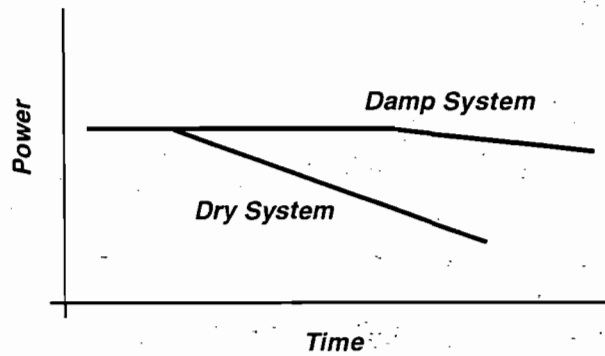


Job ID/date/12

GE Proprietary Information  
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GE Aircraft Engines

## Deterioration of Power vs Time

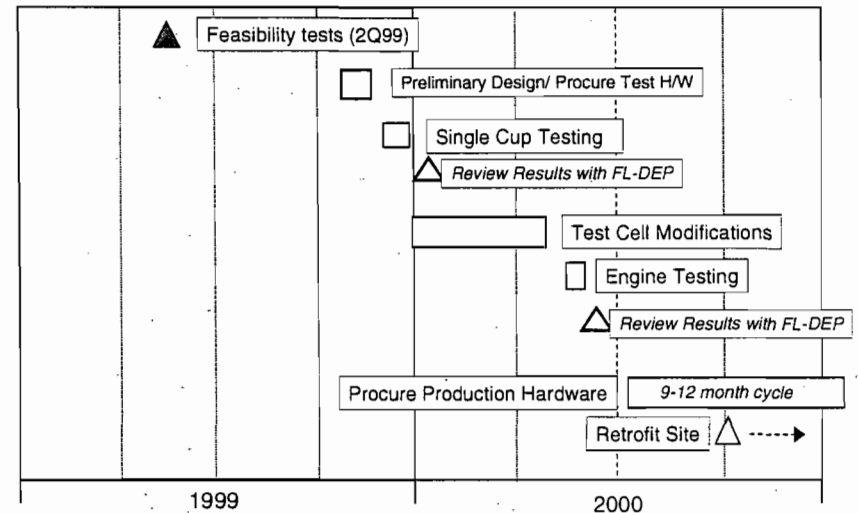


Job ID/date/13

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## Water Injection Program Schedule



Job ID/date/14

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GE Aircraft Engines

## Summary

**SPRINT Feasibility demonstrated near attainment of permit level**

**15-16 PPM Demonstrated**

**Selective H2O injection will**

- further reduce NOx
- Offset deterioration

**Potential for 12-13 ppm**

**Need engine test to confirm**

**Combination of these two concepts will achieve emissions objectives for Bartow Plant**

Job ID/date/15

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GE Aircraft Engines

## Proposal

- GE proposes to invest in damp technology to meet permit limits at Bartow
  - Avoids SCR solution and increased operating costs for CSW
  - Avoids issues of ammonia slip at site
  - Leads to better control technology in aeroderivative gas turbine
- Confidence that this will lead to a successful solution
- Will involve FL-DEP in technical status reviews
- At time of engine test a go-no go determination will be made
  - If required, we are poised to initiate PO for SCR retrofit at that time

Job ID/date/16

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GE Aircraft Engines



ORANGE COGENERATION, LP

1341

Database Report

1341

Vendor Acct:

FLORIDA DEP OL Florida DEP

00000000000000880 10/22/99

Voucher Number Invoice Number

Inv. Date Outstanding Amt. Net Paid Amount

00000000000000867 10/22/99

10/22/99 \$250.00 \$250.00

\$250.00

\$250.00



ORANGE COGENERATION, LP

1125 HWY 98 SOUTH  
SUITE 100  
LAKELAND, FL 33801  
941-682-6338

CITRUS & CHEMICAL BANK  
LAKELAND, FLORIDA

1341

DATE

AMOUNT

10/22/99

\$250.00

PAY  
TO THE  
ORDER  
OF

Two Hundred Fifty Dollars And 00 Cents

Florida DEP  
Annual Emissions Fee  
PO Box 3070  
Tallahassee FL 32315-3070

*Laura Burr*

SECURITY FEATURES INCLUDED. DETAILS ON BACK.