October 22, 1999

Ms. Angela R. Morrison
Hopping Green Sams & Smith
123 South Calhoun Street
Tallahassee, FL 32314

Dear Angela:

I have enclosed your copy of the letter to the FDEP regarding a permit modification for Orange Cogeneration Limited Partnership. I have also enclosed the original and a check for delivery to Mr. Fancy. Please have his copy delivered on Monday.

I appreciate your help and look forward to working with you in resolving this issue with the FDEP.

Sincerely,

Wade Smith
General Manager

Enclosures

1125 US Highway 98 South • Suite 100 • Lakeland, Florida 33801
(941) 682-6338 • FAX (941) 683-8257

December xx, 1998

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

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

Re: Permit Modification No. 1050231-001-AV and 1050231-004-AV
Orange Cogeneration Facility, Extension of NO_X Compliance Date

Dear Mr. Smith:

The Department has reviewed the modification requested in your letter dated September 25, 1998. The referenced permit is hereby modified as follows:

SPECIFIC CONDITION A.6

The compliance date is hereby changed to January 1, 2000 in the table for NOx for this specific condition.

APPENDIX S, TABLE 1-1

The compliance date is hereby changed to January 1, 2000 in the table for NOx.

A copy of this letter shall be filed with the referenced permit and shall become part of the permit. This permit revision is issued pursuant to Chapter 403, Florida Statutes. Any party to this order (permit revision) has the right to seek judicial review of it under Section 120.68, F.S., by the filing of 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 of Appeal must be filed within (thirty) days after this Notice is filed with the Clerk of the Department.

Sincerely,

Howard L. Rhodes, Director
Division of Air Resources
Management

HLR/aal

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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

DEP File Nos. 1050231-003-AC and 1050231-004-AV, PSD-FL-206C
Orange Cogeneration Facility
Polk County

The Department of Environmental 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 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 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 applicable 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 an extension until January 1, 2000 to meet the lower limit using Dry Low NOx technology (DLN). This will allow General Electric additional time to incorporate 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 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 30 (thirty) days from the date of publication of "Public Notice of Intent to Issue Air Construction and Title V Permit Modifications." 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 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 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:

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.

In the Matter of an
Application for Permit Modifications by:

Orange Cogeneration L.P., Inc.
1125 US Highway 98 South, Suite 100
Lakeland, Florida 33801

/

DEP File Nos. 1050231-003-AC
1050231-004-AV
PSD-FL-206C
Orange Cogeneration Facility
Polk County

INTENT TO ISSUE AIR CONSTRUCTION AND TITLE V PERMIT MODIFICATIONS

The Department of Environmental Protection (Department) gives notice of its intent to issue air construction and Title V permit modifications (copy of draft air construction and Title V permit modifications attached) for the proposed action, as detailed in the application specified above, for the reasons stated below. This permitting action will also ultimately modify Title V permit number 1050231-001-AV.

The applicant, Orange Cogeneration L.P., Inc. applied on September 29, 1998, to the Department for air construction and Title V permit modifications to extend the final nitrogen oxides emissions compliance date for its combined cycle combustion turbine located in Bartow, 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 air construction and Title V permit modifications are required to extend the final date until January 1, 2000 to comply with the lower nitrogen oxides emission standard (15 ppm).

The Department intends to issue these air construction and Title V permit modifications 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, 62-213, 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 and Title V Permit Modifications." 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 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." Written comments should be provided to the Department's Bureau of Air Regulation at 2600 Blair Stone Road, Mail Station #5505, Tallahassee, FL 32399-2400. Any written comments filed shall be made available for public inspection. If written comments received result in a significant change in the proposed agency action, the Department shall revise the proposed permit and require, if applicable, another Public Notice.

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

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

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

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

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

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

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

the underlying statute (implemented by the rule); and (h) A statement whether the variance or waiver is permanent or temporary and, if temporary, a statement of the dates showing the duration of the variance or waiver requested.

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

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

Executed in Tallahassee, Florida.

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 and Title V Permit Modifications (including the Public Notice, and Draft permit modifications) was sent by certified mail (*) and copies were mailed by U.S. Mail before the close of business on _____ to the person(s) listed:

Allan Wade Smith, Orange Cogeneration L.P., Inc. *
Doug Neeley, EPA
Gracy Danois, EPA
John Bunyak, NPS
Bill Thomas, 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) (Date)

ORANGE COGENERATION

RECEIVED

JUN 28 1999

BUREAU OF AIR REGULATION

RESPONSE REQUESTED

June 25, 1999

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_x 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_x 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_x 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
- $SCONO_x$ 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 SCONOx 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 SCONOx 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.

1125 US Highway 98 South • Suite 100 • Lakeland, Florida 33801
(941) 682-6338 • FAX (941) 683-8257

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_x 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_x 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_x 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_x 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_x 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_x 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 7BA

Attachment 1

APR 23 '99 15:20 FR FW SERVICE 908 713 3210 TO 915135525722 P.01/08

→ Guyanne Johnson
→ Dennis Dolan
→ Wade Smith

FOSTER WHEELER ENERGY CORPORATION
PERRYVILLE CORPORATE PARK • CLINTON • NJ 08809-4000 • 908-730-4000

Jim/o

FAX TRANSMITTAL SHEET 04/23/99

TO:	FROM:
MR. RICK HOOK	YAJAIRA ORTIZ
COMPANY:	TOTAL NO. OF PAGES INCLUDING COVER:
CSW ENERGY	8
FAX NUMBER:	SENDER'S TELEPHONE NUMBER:
(513) 552-5722	(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 .....$1,578,000
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, SOx) or NH_3 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_3 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. NOx 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 .

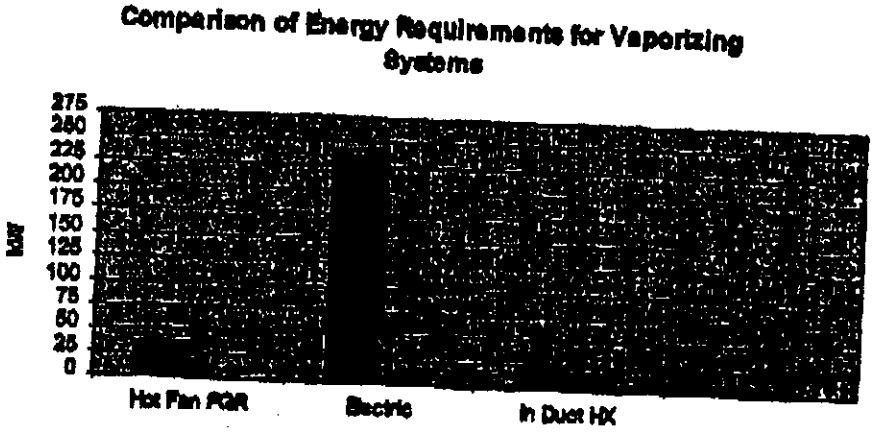
9. FWEC and/or it agent shall be allowed to comment upon SCR catalyst test procedures and witness any performance tests.

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 ≤ 10% of the mean. At the catalyst inlet the flow distribution should satisfy an RMS deviation ≤ 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 ± 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. SOx 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.



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

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
	CATALYST REACTOR HOUSING:			
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
	CATALYST HANDLING / MAINTENANCE FACILITIES:			
8	CATALYST LOADING DOORS			X
9	ACCESS DOORS IF WE SUPPLY TRANSITIONS			X
10	MONORAIL AND HOIST			X
11	PLATFORMS, LADDERS AND STAIRWAYS			X
	HRSG TRANSITIONS:			
12	INLET AND OUTLET TRANSITION DUCTS WITH INTERNAL INSULATION AND LINER		X	
	ACCESSORIES:			
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
	TECHNICAL FIELD ASSISTANCE:			
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

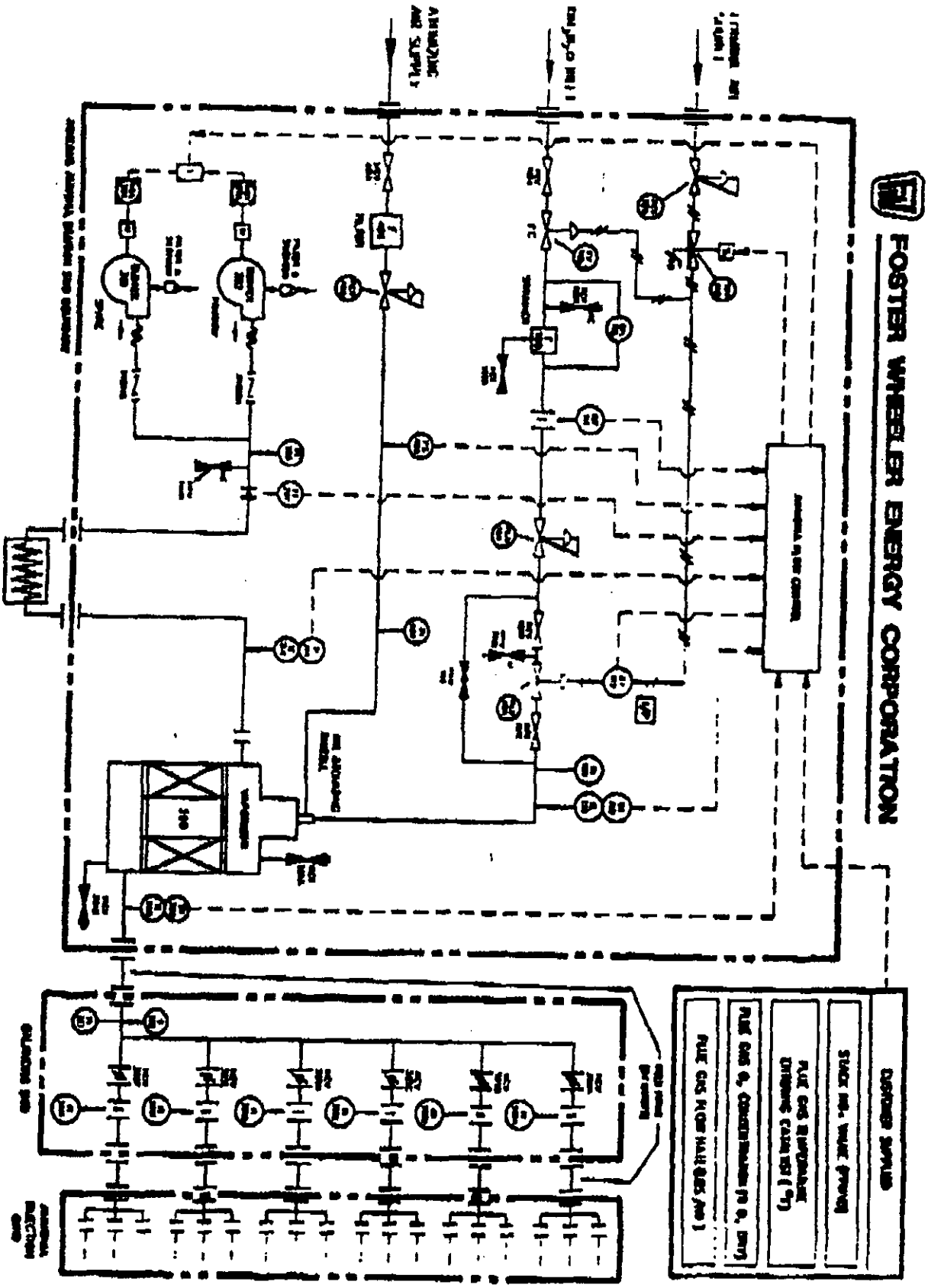
ITEM	DESCRIPTION	FWEC SCOPE	OPTION	NOT Included
1	AMMONIA INJECTION GRID WITH NOZZLES OR ORIFICES	X		
2	INJECTION GRID HOUSING & SUPPORT IN YOUR FLUE			X
	AMMONIA INJECTION HEADER ASSEMBLY (MOUNTED AT GRADE):			
3	AMMONIA INJECTION HEADER - ONE PIECE	X		
4	MANUAL TRIM VALVES	X		
5	FLOW INDICATORS	X		
6	MANUAL SHUT-OFF VALVES	X		
7	SUPPORT OF INJECTION HEADER	X		
	AQUEOUS AMMONIA DILUTION/ EVAPORATION & FLOW CONTROL SKID:			
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

	AQUEOUS AMMONIA STORAGE AND FORWARDING EQUIPMENT:			
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
	EXTERNAL PIPING:			
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
	ANCILLIARY EQUIPMENT:			
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
	FLUE GAS ANALYZERS:			
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		
	GAS SAMPLING PORTS:			
42	INLET NOX/O2 PORT IN YOUR FLUE			X
43	STACK SAMPLING PORTS IN YOUR STACK			X

FOSTER WHEELER ENERGY CORPORATION

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



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: 3/31/99
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 theSCR 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)	
DIRECT COSTS (DC)				
PURCHASED EQUIPMENT COSTS (PEC)				
SCR & AUXILIARY EQUIPMENT	**AS ESTIMATED, A**	**VENDOR QUOTE**	**$930,000.00**	
INSTRUMENTATION	0.05 X A	(EPA, 1990d)	$46,500.00	
STATE SALES TAXES	0.06 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		**$1,032,300.00**	
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)	**$278,721.00**	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	**$1,311,021.00**	
INDIRECT COSTS (IDC)				
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	-	**$315,013.00**	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		**$1,626,034.00**	

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) @i=10%,n=20: 0.1175 cost of money 10%

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	$88,000	Assume same as NEPCO
CATALYST DISPOSAL	$15/CF	(EPA,1993b)	$10,800	Assume same as NEPCO
AQUEOUS AMMONIA	$378/ton	(EPA,1993b)	$310,929	Assume same as NEPCO
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)	-	
			$589,796	
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	
			$310,493	
TOTAL ANNUAL COSTS, $/YR			**$900,289**	
TOTAL NET NOx REDUCTIONS (TPY)				
Oil Firing			0	
Gas Firing			125	
Total			**125**	
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 theSCR 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)	
DIRECT COSTS (DC)				
PURCHASED EQUIPMENT COSTS (PEC)				
SCR & AUXILIARY EQUIPMENT	**AS ESTIMATED, A**	**VENDOR QUOTE**	**$2,749,762.40**	
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		**$3,189,724.38**	
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)	**$0.00**	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	**$3,189,724.38**	
INDIRECT COSTS (IDC)				
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	-	**$318,972.44**	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		**$3,508,696.82**	

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) @i=10%,n=20: 0.1175 cost of money 10%

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	$88,000	
CATALYST DISPOSAL	$15/CF	(EPA,1993b)	$10,800	360 cu ft
AQUEOUS AMMONIA	$378/ton	(EPA,1993b)	$310,929	93.9pph
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)	-	
			$589,796	
INDIRECT ANNUAL COSTS, $/YR				
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	
			$578,696	
TOTAL ANNUAL COSTS, $/YR			**$1,168,492**	
TOTAL NET NOx REDUCTIONS (TPY)				
Oil Firing			0	
Gas Firing			125	
Total			**125**	
INCREMENTAL COST EFFECTIVENESS, $/TON			**$9,348**	

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 theSCR 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)	
DIRECT COSTS (DC)				
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**	
INDIRECT COSTS (IDC)				
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) @i=10%,n=20: 0.1175 cost of money 10%

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	$167,200	Assume same as NEPCO
CATALYST DISPOSAL	$15/CF	(EPA,1993b)	$20,520	Assume same as NEPCO
AQUEOUS AMMONIA	$378/ton	(EPA,1993b)	$590,765	Assume same as NEPCO
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)	-	
			$958,553	
INDIRECT ANNUAL COSTS, $/YR				
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	
			$384,597	
TOTAL ANNUAL COSTS, $/YR			**$1,343,150**	
TOTAL NET NOx REDUCTIONS (TPY)				
Oil Firing			0	
Gas Firing			238	
Total			**238**	
INCREMENTAL COST EFFECTIVENESS, $/TON			**$5,643**	

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 theSCR was supplied by a vendor. SCR-BACT to 6 ppm, Quote N

BACT ANALYSIS

CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION

6 ppm

COST ITEM	COST FACTOR	REFERENCE	COST ($1999)	
DIRECT COSTS (DC)				
PURCHASED EQUIPMENT COSTS (PEC)				
SCR & AUXILIARY EQUIPMENT	**AS ESTIMATED, A**	**VENDOR QUOTE**	**$3,372,917.00**	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		**$3,912,583.72**	
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)	**$0.00**	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	**$3,912,583.72**	
INDIRECT COSTS (IDC)				
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	-	**$391,258.37**	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		**$4,303,842.09**	

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) @i=10%,n=20: 0.1175 cost of money 10%

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	Twice the amount for 15 ppm
CATALYST DISPOSAL	$15/CF	(EPA,1993b)	$21,600	Twice the amount for 15 ppm
AQUEOUS AMMONIA	$378/TON	(EPA,1993b)	$621,858	Twice the amount for 15 ppm
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)	-	
			$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 theSCR was supplied by a vendor. SCR-BACT to 3.5 ppm, Quote F

BACT ANALYSIS

CAPITAL COST FACTORS FOR SELECT CATALYTIC REDUCTION

COST ITEM	COST FACTOR	REFERENCE	COST ($1999)	
DIRECT COSTS (DC)				
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	1.16 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**	
INDIRECT COSTS (IDC)				
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

CAPITAL RECOVERY FACTOR (CRF) @i=10%,n=20: 0 1175 cost of money 10%

0.1
20

	FACTOR	REFERENCE	1999 COSTS, $/YR	
DIRECT ANNUAL 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	Scaled
CATALYST DISPOSAL	$15/CF	(EPA,1993b)	$23,220	Scaled
AQUEOUS AMMONIA	$378/ton	(EPA,1993b)	$668,498	Scaled
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)	-	
			$1,060,985	
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	
			$435,163	
TOTAL ANNUAL COSTS, $/YR			**$1,496,148**	
TOTAL NET NOx REDUCTIONS (TPY)				
Oil Firing			0	
Gas Firing			269	
Total			**269**	
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 theSCR 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)	
DIRECT COSTS (DC)				
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		**$7,766,000.00**	
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)	**$0.00**	
SITE PREPARATION	N/A	-	-	
BUILDINGS	N/A	-	-	
TOTAL DC	1.27 X B	-	**$7,766,000.00**	
INDIRECT COSTS (IDC)				
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	-	**$715,960.00**	
TOTAL CAPITAL INVESTMENT (TCI)	1.84 X B		**$8,481,960.00**	

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) @i=10%,n=20: 0.1175 cost of money 10%

0.1
20

DIRECT ANNUAL COSTS, $/YR	**FACTOR**	**REFERENCE**	**1999 COSTS, $/YR**	
OPERATING LABOR	$27.82/HR @ 1HR/12HR	(COT & EPA 1993b)	$0	No incremental cost
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	
			$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 NOx REDUCTIONS (TPY)				
Oil Firing			0	
Gas Firing			125	
Total			125	
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) 552-5059

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% O2). 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 NOx 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

MEMORANDUM

SUBJECT: New Source Review Program

FROM: John S. Seitz, Director
Office of Air Quality Planning and Standards (MD-10)

TO: See Addressees

The purpose of this memorandum is to alert you to some concerns we have regarding part of the New Source Review (NSR) program, i.e., the Prevention of Significant Deterioration (PSD) program, and to ask your assistance in determining the true extent of any problem. The concern focuses on whether or not the PSD program is being implemented appropriately in all areas of the country. The PSD program is an important part of our air quality management program, and is one on which we plan to rely heavily as we move toward implementing the new ozone standard in transitional areas. We will need your support in gathering additional data that will allow us to better assess this situation. If this further study confirms that the PSD program is not being implemented appropriately, corrective action will be required.

Our concerns grow out of conversations with personnel from the Office of Enforcement and Compliance Assurance (OECA), the letter to Administrator Carol Browner from Peter Hamlin, Chief of the Iowa Air Quality Bureau, and a review of information submitted to my staff by the National Park Service (NPS). Based on these, I am concerned that a number of problems related to program implementation may exist, as we discussed at our meeting in Las Vegas. Given the importance of the PSD program to managing our national air quality program, it is critical for us to take steps to gather additional information on this issue. In addition, I believe that there are several steps we should take to better monitor the PSD program as we implement it over the next year, and to address the kinds of issues that have been raised.

First, I am asking each Regional Office to review and comment on the specific permits described in the NPS memorandum which was sent to your staff in early January (see attached). By May 7, 1999, I ask that you respond with a memorandum describing whether you agree or disagree with the conclusions reached in the NPS memorandum as it relates to the permits issued by States in your Region. If problems are identified, your memorandum should also recommend any specific actions that you believe should be taken.

USEPA:OAQPS:ITPID:IIG:KBlanchard:ybthorpe:x5503:NCMU:MD-12:04/02/99
FILENAME: A:\prgrev.wpd
FILE: REG 149 A

Coordinated with: Region VII, OECA (C. Holmes), OGC (did not respond)

Second, I ask that you obtain for review the preliminary and final determinations for all PSD permits issued by the States in your Region or those currently undergoing review within the Region since January 1, 1997. We are aware that this request may require obtaining a copy of the documents from a State or local agency in those cases where copies have not already been provided to the Region. Given the concerns expressed about the resources such a review would entail, we are willing to provide on-site assistance to each Region to assist in the compilation of these data. In order to schedule such assistance, you should have these determinations available for review by June 1, 1999. Once the determinations are collected, we intend to extract the following information:

1. facility name, permit ID, source type, location and Standard Industrial Classification (SIC) code(s);
2. project description (boiler, dryer, etc.), emission unit number, operating limit/units, size or capacity/units, fuel type;
3. the control technology selected as Best Available Control Technology (BACT);
4. whether the cost analysis followed EPA guidance and whether the documentation was adequate;
5. the pollutants emitted;
6. the permitted emission rates;
7. the distance to the Class I area and whether the Federal Land Manager (FLM) was notified appropriately;
8. whether the Regional Office commented on the permit and, if so, whether the permitting authority incorporated the Regional Office comments;
9. whether the BACT determination is more stringent than the applicable New Source Performance Standards (NSPS) and, if so, the number of tons per year of emissions that were prevented;
10. where there was no applicable NSPS, whether BACT was more stringent than the applicable State Implementation Plan (SIP) limit; the number of tons per year of emissions which was prevented by applying BACT; [This step will require that a copy of each State/local SIP rule be available.]
11. the monitoring, record keeping and reporting requirements that were applied, such as continuous emission monitoring, averaging times, etc.

If you do not require assistance in developing this information, we will provide you with a common format spreadsheet on which the data should be entered. In those cases where we assist in the compilation, we will provide you with a copy of your Region's data for your review.

Though the PSD program is the primary focus of this effort, we are also interested in gathering some data on the nonattainment NSR program. Due to the resource constraints we all have, I recommend we do this prospectively by conducting a closer review of NSR permit applications, preliminary determinations, final determinations and tracking the permits that finally are issued for applications received since January 1, 1999. For nonattainment NSR permits, the information needs are somewhat different. Since the Class I area and FLM status are not applicable, and the Lowest Achievable Emission Rate (LAER) is needed in lieu of BACT for the nonattainment NSR permits please substitute the following information for items 3, 4, 7, 9, and 10 above:

3a. the emission limit and control technology selected as LAER;
4a. whether cost (or other factors) was an issue in determining what technology was selected as LAER;
7a. whether the offsets were appropriately obtained and documented;
9a. whether the LAER determination was more stringent than the applicable NSPS level of control and, if so, the estimate of the additional tons of emissions reductions that were obtained;
10a. where there is no applicable NSPS, whether LAER was more stringent than the applicable SIP limit; if so, the number of additional tons per year prevented from entering the environment.

In addition to the information gathering steps described above, some additional work will be necessary including activities that could require reprogramming of resources. First, for the FY 2000-01 program guidance, we are requiring more reporting from the Regional Offices for PSD and nonattainment NSR permits which will be reviewed during the upcoming years. Second, we are coordinating closely with OECA in their enforcement initiative relating to the PSD and nonattainment NSR programs. Finally, we are also considering re-instituting the annual conference among Headquarters, Regional Office, and State and local agency staff for training purposes, and to help promote national consistency in matters pertaining to these programs.

I expect to be communicating with our colleagues from the State and local agencies about this matter in the near future. In developing this plan, we have worked closely with Region VII, the sub-lead region for permits. I look forward to hearing from you, and urge your cooperation in making this a high priority. If you have any questions, please contact Karen Blanchard at (919) 541-5503.

Attachment

Addressees:
Director, Office of Ecosystem Protection, Region I
Director, Division of Environmental Planning and Protection, Region II
Acting Director, Air Protection Division, Region III
Director, Air, Pesticides and Toxics Management Division, Region IV
Director, Air and Radiation Division, Region V
Director, Multimedia Planning and Permitting Division, Region VI
Director, Air, RCRA and Toxics Division, Region VII
Assistant Regional Administrator, Office of Pollution Prevention, State and Tribal Programs, Region VIII
Director, Air Division, Region IX
Director, Office of Air Quality, Region X

bcc: NSR Team
RO NSR Contacts

Excerpt from NPS Memo: December 1998, Don Shepherd to John Notar

Orange Cogeneration—Bartow (CHAS/FL)-- Orange Cogen (Orange) received a permit from FDEP for installation of a two new 41 MW Combined Cycle Turbines (CCT) with NO_x to be controlled to 15 ppm by Dry Lox-NO_x (DLN) combustors. However, Orange has experienced difficulties in meeting that limit and has requested until 1/1/2000 to do so.

Although FDEP does not have the authority to revisit BACT in this case, it is my understanding that EPA policy demands that any revision and/or extension of a PSD permit must consider possible changes in BACT subsequent to the issuance of the original permit. In this case, Orange should be required to perform a new BACT analysis, with particular attention to the feasibility of installing Selective Catalytic Reduction (SCR) on this CCT. FDEP implied that EPA intervention would be given serious consideration.

DRAFT

July 15, 1999

CERTIFIED MAIL – Return Receipt Requested

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

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

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 Model No. LM6000 combined cycle combustion turbines. Summarizing, your letter requested the Department's determination based on the following information:

- The existing units are not able to achieve the BACT emissions standard of 15 ppmvd @ 15% oxygen with dry low-NOx (DLN) technology alone.
- NOx control by XONON™ technology was rejected as not commercially available. (The Department confirmed that General Electric 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 GE Frame 7EA and 7FA units.)
- SCONOx™ technology was rejected as not being demonstrated for this size gas turbine and having limited commercial availability.
- Replacement of the LM6000 units with derated LM6000PD units would not be economically feasible.
- Economic analyses were presented based on three different levels of NOx control with SCR: 3.5, 6.0, and 15.0 ppmvd @ 15% oxygen.

Based on the information provided, the Department does not believe the cost effectiveness for SCR to be prohibitive to the applicant considering that the manufacturer (General Electric) has agreed to pay control costs to achieve the original guarantee of 15 ppmvd @ 15% oxygen. The Department is also aware that other companies have found SCR to be cost-effective and installed this technology on LM6000 units[1]. Further, the

Department believes a NOx limit of 9 ppmvd @ 15% oxygen is representative of the higher acceptable range for current BACT limits for combined cycle gas turbines.

Therefore, the Department recommends that you proceed with the bid process for the installation of an appropriately designed SCR control system with ammonia injection. The design must include provisions to periodically monitor and maintain ammonia slip below 5 ppm. A modification of the current PSD construction permit to will be required to specify the new control system, establish new NOx emissions standards, and provide adequate testing and monitoring requirements. Because this modification would reduce maximum permitted NOx emissions, additional modeling should not be necessary. The Department would consider a request for a limited extension of the current permit if accompanied by a formal compliance plan with a proposed construction schedule to complete installation of the additional control equipment. The Department may revise this determination based on any additional information provided, such as the ongoing vendor inspection reports regarding the HRSG capabilities for incorporating SCR.

If you have any additional questions, please contact me at 850/488-0114.

Sincerely,

Al Linero, P.E., Administrator
New Source Review Section

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

[1] Texas Permit No. 37984 for Lubbock Power & Light, two LM6000PC units with a NOx limit of 9 ppmvd @ 15% oxygen controlled with SCR, and the following article from the November 1998 issue of Power Engineering: "LP&L Begins the LM6000 Sprint"

INTEROFFICE MEMORANDUM

Date: 15-Jul-1999 02:20pm
From: Hook, Rick
GEAE) (
Rick.Hook@ae.ge.com

Dept:
Tel No:

To: 'Linero_A@DEP.STATE.FL.US' (Linero_A@dep.state.fl.us)
CC: Leonard, Gary (GEAE) (Gary.Leonard@ae.ge.com)
CC: 'Wade Smith, CSW' (WSmith@csw.com)

Subject: Orange Cogeneration

Dear Al -

Gary Leonard mentioned the conversation that you and he had yesterday regarding the permit situation at Orange Cogeneration. Over the last couple of months, we have made some measurements at Orange Cogen with a simulated Sprint on that engine and have been encouraged by the emissions/ power improvement that we attained with this rather crude simulation.

Based on this, we believe it may be possible to configure a modified Sprint system to achieve the 15 ppm site permit and are working timing / cost estimates to demonstrate such a system. I'd anticipate a technology demo in 1st half of 2000.

This idea is rather new and I've discussed it briefly with Wade Smith of CSW. He is open to exploring this option.

I would like to discuss this and its potential for impacting any near term decisions regarding the OrangeCo permit with you. Please let me know when is convenient for you.

Best regards,

RB (Rick) Hook
LM6000 Technical Programs Mgr.
GE Industrial Aeroderivative Gas Turbines
(513) 552-5925

Permit # per TACB	Permit NOx Limit pmvd PSD	Issued	Company Name	Location (City, County)	Type	Number of Units	MW Unit @15%O2;Method
36889	---	04/01/98	Houston Industries Power Generating, Inc.	Orange, Orange	F7FA F6B	2	44 6;SCR+CO Cat
37227	894 N005	In Review	Air Liquide America Corp	La Porte, Harris	F7EA	3	95 5-9;SCR
37283	915 N015	In Review	Calpine Corp.	Pasadena, Harris	W501F	1	160 12;SCR
37302	895	08/17/98	Edinburg Energy	Edinburg, Hidalgo	ABB GT-24	4	180 15;D
37391	897	07/29/98	Tenaska Frontier Partners	Shiro, Grimes	F7FA	3	170 15;D
37613	900	07/31/98	Frontera Generating L.P.	Mission, Hidalgo	F7FA	2	165 15:D
735B		06/26/98	BASF	Freeport, Brazoria	F7EA	1	83 15:D
(Amended existing boiler permit to add cogen)							
37894		In Review	Lubbock Power & Light	Lubbock, Lubbock	LM6000PC	2	42 9;SCR
38183	907	In Review	City Public Service	Elmendorf, Bexar	F7FA	2	170 9;SCR
38191	906	In Review	Venus Energy Ltd.	Midlothian, Ellis	ABB GT24 OTC	4	175 5;SCR
38284	909	In Review	Calpine Magic Valley	Edinburg, Hidalgo	W501G	2	230 12;SCR
38326	916	In Review	Panda Paris, LLC	Paris, Lamar	F7FA	4	170 15;D
38484	911 N013	In Review	Air Products, Inc	La Porte, Harris	W501F	1	168 7:SCR
38599	914	In Review	Duke Energy Hidalgo, LP	Edinburg, Hidalgo	F7FA	2	170 15;D
38659		In Review	Panda Guadalupe Power	New Braunfels, Guadalupe	F7FA/W501F	4	170/160 15;D