UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4APT-AEB

JUN 18 1993

RECEIVED
JUN 23 1993
Division of Air Resources Management

Mr. Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Central Florida Power Limited Partnership,
Tiger Bay Cogeneration Plant (PSD-FL-190)

Dear Mr. Fancy:

This is to acknowledge receipt of the final determination and Prevention of Significant Deterioration (PSD) permit for the above referenced facility, by your correspondence dated May 19, 1993. The proposed facility will be a 258 megawatt combined cycle cogeneration power plant. The proposed project consists of one advanced technology heavy-duty industrial gas turbine electric generating unit, with a duct burner-fired heat recovery steam generator, and a steam turbine generator.

Your determination proposes to limit NO_x emissions from the combustion turbine through advanced dry low-NO_x combustors and water injection, to limit NO_x emissions from the duct burner through combustion design, to limit CO and VOC emissions from the combustion turbine and duct burner through combustion control, and to limit PM/PM_{10}, Be, and As emissions from the combustion turbine through combustion control and the use of clean fuels. In addition, this facility will meet revised, lower NO_x limits no later than December 31, 1997, through advanced combustor technology or the use of selective catalytic reduction.

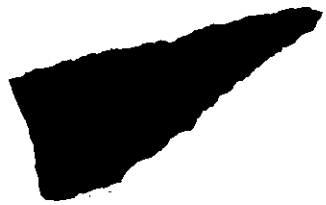
We have reviewed the package as submitted and have no adverse comments. Thank you for the opportunity to review and comment on the package. If you have any questions or comments, please contact Mr. Scott Davis of my staff at (404) 347-5014.

Sincerely yours,

Brian L. Beals, Chief
Source Evaluation Unit
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: J. Heron
C. Hullinger
P. Thomas, FDEP
G. Bunyak, NPS
K. Kosky, P.E., KBN
L. Novak, Polk Co

40TPA530223
Central Florida



March 11, 1993

Mr. Clair H. Fancy, P.E.
Chief, Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 3299-2400

RE: Central Florida Power Limited Partnership (CFPLP)
Tiger Bay Cogeneration Plant
AC 53-214903; PSD-FL-190

Dear Clair:

This correspondence provides technical information for the Department's consideration concerning the comments received from the U.S. Fish and Wildlife Service (USFWS) dated February 5, 1993 on the above referenced project. Specifically, the USFWS suggested the final permit for the project include a statement that selective catalytic reduction (SCR) be installed if the 15 ppmvd (corrected to 15 percent oxygen) emission limit is not met and that the Department re-establish an allowable emissions limit as best available control technology (BACT) if actual emissions are tested less than 15 ppmvd. The information contained herein and in the permit record clearly suggest that the final permit should not contain the suggestions made by the USFWS. The rationale is presented below.

Mandating SCR

Modifying the proposed language of the permit to include a provision mandating SCR is unwarranted. The condition as proposed by the Department clearly recognizes that it will be at the determination of the Department whether SCR will be installed. This allows flexibility to incorporate other design features to meet the 15 ppmvd NOx emission limit if desired by the Department. As "pollution prevention" technology progresses over the next several years there may be other options of lowering NOx to meet emission limits. For example, the combined use of dry-low NOx combustion and wet injection may prove to be a viable technique. Research is also being performed in the area of fuel additives. Mandating the installation of SCR, if a permit limit is not met, does not recognize the development of future technologies and does not provide the Department or CFPLP the inherent flexibility to make an appropriate decision.

Lowering the Permit/BACT Limit

Incorporating a provision in the permit that will require the lowering the BACT limit is not appropriate for several reasons. First, there have been no criteria proposed for establishing such a lower limit. While the initial performance tests may find a NOx emission rate lower than 15 ppmvd corrected, this tested rate will only be an accurate representation of NOx emissions that occurred during the specific conditions observed during the tests. Combustion turbines are sensitive to ambient meteorological

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

conditions such as temperature and relative humidity. Changes in meteorological conditions, for which CFPLP will have no control, may cause changes in NOx emissions. Such conditions are recognized in the margins incorporated into the design features of the control equipment. An example of how operational conditions can affect NOx emissions was previously supplied to the Department for the Orlando CoGen Limited, L.P. Project. Information was supplied to the Department that indicated that actual NOx tested as low as 9 to 13 ppmvd for the combustion turbine proposed for the project. However, the vendor would only guarantee 15 ppmvd since margins are required to assure compliance with the permit limits under all operating scenarios. The Department accepted this rationale in this permit decision.

Second, the proposed project is being designed for operation in late 1994 to early 1995. While it is recognized that combustion turbine units proposed for operation in the future (> 1997) have proposed lower limits, equipment proposed for these projects may not be applicable to the proposed project. The earlier commercial operation date for the CFPLP facility suggests that differences in equipment may result.

Third, all equipment degrades whether it be dry low-NOx combustors, SCR or a fabric filter. The emission margins built into all control equipment recognizes this fact and an appropriate emission limit must be established to account for emission changes as a result of equipment degradation.

Apparent Preference for Technology Comments by USFWS

The State of Florida has full authority for implementing the federally mandated Prevention of Significant Deterioration program through approval of its regulations and State Implementation Plan (SIP). The federal agencies comment on the PSD applications and have differing authority. The USFWS which is the designated Federal Land Manager for National Wilderness Areas Class I areas has review authority of air quality related values in such areas. The Environmental Protection Agency has authority in establishing the implementing regulations for PSD review and approval, and establishing guidelines for modeling and control technology review. For the CFPLP project, the EPA comments (see letter dated February 16, 1993), suggest that the Department's permitting decision was appropriate. The EPA is clearly the appropriate agency regarding control technology issues. In contrast, the USFWS which is the appropriate agency for air quality related values, had no adverse comments regarding the NOx impacts in the Class I area. Indeed, the USFWS indicated that the NOx impacts at the emission limits proposed by the Department were not significant. The USFWS comments should be viewed in this context; i.e., lowering the NOx emission limit will not change the conclusion reached regarding impacts (i.e., impacts will still not be significant). Moreover, the EPA comments concerning control technology (as well as emission limits) should take preference over USFWS comments.

Conclusion

The technical information presented herein and the permit record clearly indicate that the emission limits proposed by the Department in the draft permit are appropriate. Taken together with the commercial concerns expressed by CFPLP (see letter of March 10, 1993, from Destec Energy the controlling partner), we respectively request the Department not incorporate the comments made by the USFWS into the final permit.

KBN

As always, the assistance of you and your staff are greatly appreciated. Please call if you have any questions.

Sincerely,

Kennard F. Kosky

Kennard F. Kosky, P.E.
President and Principal Engineer
Florida Registration No. 14996

cc: Terrsa Heron
Preston Lewis
R. Chatham
C. Hollada
attachment Q. Harper, EPA
KFK/mlb J. Bunyak, NPS
B. Thomas, SWD

12018A1/15

DESTEC ENERGY

March 10, 1993

DESTEC ENERGY, INC.
2500 CITYWEST BLVD., SUITE 150
P.O. BOX 4411
HOUSTON, TEXAS 77210-4411
(713) 735-4000

Mr. C. H. Fancy
Chief, Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

VIA FEDERAL EXPRESS

Re: Central Florida Power, L.P. - DER No. AC53-214903 & PSD-FL-190

Dear Mr. Fancy:

On behalf of Central Florida Power, L.P. (CFPLP), I respectfully request the following comments be entered into the Department's record:

We have given serious consideration to the issue of revising emission limits after performance testing and emission data if such a lower rate is achievable. Our experience with lenders indicates that they would be unlikely to commit funds to a project with such a permit condition. We, as well as the financial community, are well aware that the regulatory agencies have the authority to impose new requirements on existing facilities. This "regulatory risk" is taken into account during the development of the project financing. A specific condition in the permit stating the Department's authority to revise the allowable emission limit would bring the "reliance on" the permit into question. Therefore, we request that no such condition be in the final permit for a change in the emission limits based on actual emission rates and that the Department rely on the regulation to provide for revision to the allowable limits.

We respectfully request that you consider our comment and would be pleased to address any other questions or concerns you might have. We appreciate the efforts on the part of the Department in reviewing our permit application and we look forward to receiving our permit.

Sincerely,

Frost W. Cochran
Project Finance Manager

FWC/nl

cc: Bob Taylor
Ken Kosky
J. Regan
FWC/nl C. Holladay

RECEIVED
MAR 11 1993
Division of Air
Resources Management

g:\sectry\fwc-93\fancy.310

Patty

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION IV - ATLANTA, GEORGIA
AIR, PESTICIDES & TOXICS MANAGEMENT DIVISION

AIR ENFORCEMENT BRANCH
FACSIMILE TRANSMISSION SHEET

DATE: 2/15/93 # OF PAGES: 2

TO: Clair H. Fancy PHONE #: _____

ADDRESS: EDER FAX: _____

FROM: Scott Davis

If the following pages are received poorly, please call Angela at (404) 347-5014

SPECIAL INSTRUCTIONS FOR RECEIVER:

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365
FAX (404) 347-3059

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

4APT-AEB

FEB 16 1993

Mr. Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Central Florida Power Limited Partnership,
Tiger Bay Cogeneration Plant (PSD-FL-190)

Dear Mr. Fancy:

This is to acknowledge receipt of the preliminary determination and draft Prevention of Significant Deterioration (PSD) permit for the above referenced facility, by your letter dated January 15, 1993. The proposed facility will be a 258 megawatt combined cycle cogeneration power plant. The proposed project consists of one advanced technology heavy-duty industrial gas turbine electric generating unit, with a duct burner-fired heat recovery steam generator, and a steam turbine generator.

Your determination proposes to limit NO_x emissions from the combustion turbine through advanced dry low-NO_x combustors and water injection, to limit NO_x emissions from the duct burner through combustion design, to limit CO and VOC emissions from the combustion turbine and duct burner through combustion control, and to limit PM/PM_{10}, Be, and As emissions from the combustion turbine through combustion control and the use of clean fuels. In addition, this facility will meet revised, lower NO_x limits no later than December 31, 1997, through advanced combustor technology or the use of selective catalytic reduction.

We have reviewed the package as submitted and have no adverse comments. Thank you for the opportunity to review and comment on the package. If you have any questions or comments, please contact Mr. Scott Davis of my staff at (404) 347-5014.

Sincerely yours,

Brian L. Beals, Chief
Source Evaluation Unit
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: J. Kluger
C. Holladay
B. Thomas, SW Dist
G. Burnyak, NPS
K. Kosky, KBN
L. Novak, P. County

RECEIVED

FEB 22 1993

Division of Air
Resources Management

KBN

February 8, 1993

RECEIVED

FEB 0 9 1993

Division of Air
Resources Management

Mr. Clair H. Fancy
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Central Florida Power Limited Partnership
Tiger Bay Cogeneration Plant
PSD-FL-190
AC 53-214903

Dear Mr. Fancy:

Enclosed please find the Affidavit of Publication for advertisement of the Notice of Intent to Issue Permit for this project. As shown, the advertisement was published in The Polk County Democrat on February 4, 1993 and satisfies the publication requirements of the Intent to Issue.

If you have any questions concerning this material, please call me at your earliest convenience.

Sincerely,

Robert C. McClean
for

Kennard F. Kosky, P.E.
President

Enclosure

cc: Robert I. Taylor, Central Florida Power, L.P.
Robert Chatham, Destec Energy, Inc.
Teresa Heron, FDER
Project File
C. Holladay
B. Thomas, SW Dist
G. Harper, EPA
G. Cumpsek, WPS
G. Worley, PC

12018A1/14

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

AFFIDAVIT OF PUBLICATION

The Polk County Democra

Published Semi-Weekly
Bartow, Polk County, Florida

Case No. _____

STATE OF FLORIDA
COUNTY OF POLK

Before the undersigned authority personally appeared _____
Linda K. Holcomb, who on oath says that (s)he is
Ad Manager of The Polk County Democrat, a newspaper published at Bartow, Polk County, Florida; that the attached copy of advertisement, being a Notice of Intent to Issue Permit in the matter of Central Florida Power

in the _____ Court, was published in said newspaper in the issues of February 4, 1993.

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 Linda K. Holcomb

The foregoing instrument was acknowledged before me this 5th day of Feb., 19 93, by Linda K. Holcomb,

who is personally known to me.

Teresa M. Pacetti
(Signature of Notary Public)

Teresa M. Pacetti
(Printed or typed name of Notary Public)
Notary Public

My Commission Expires:

NOTARY PUBLIC STATE OF FLORIDA

Notary Public, State of Florida
TERESA M. PACETTI
My Comm. Exp. Dec. 19, 1995
Comm. No. CC 169408

quent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

The application 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 Regulation, Bureau of Air Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, Department of Environmental Regulation, Southwest District, 3804 Coconut Palm Drive, Tampa, Florida 33619-8218.

Any person may send written comments on the proposed action to Mr. Preston Lewis at the Department's Tallahassee address. All comments received within 30 days of the publication of this notice will be considered in the Department's final determination.

Further, a public hearing can be requested by any person(s). Such requests must be submitted within 30 days of this notice.

Feb. 4, 1993—0301

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION NOTICE OF INTENT TO ISSUE PERMIT

The Department of Environmental Regulation gives notice of its intent to issue a PSD permit to Central Florida Power, Limited Partnership (CFPLP), County Road 630, 5 miles west of Ft. Meade, Polk County, Florida, to construct a 258 MW cogeneration facility. A determination of Best Available Control Technology (BACT) was required. The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, 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 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within (14) days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department 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 Petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, 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 decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party

United States Department of the Interior

FISH AND WILDLIFE SERVICE
75 Spring Street, S.W.
Atlanta, Georgia
30303

February 5, 1993

Mr. C. H. Fancy
Chief, Bureau of Air Regulation
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Fancy:

We have completed our review of Central Florida Power's (CFP) permit application and the Florida Department of Environmental Regulation's (FDER) Technical Evaluation and Preliminary Determination document regarding the proposed 258 MW Tiger Bay cogeneration project. This facility would be located near Ft. Meade, approximately 120 km southeast of the Chassahowitzka Wilderness Area (WA), a Class I air quality area administered by the Fish and Wildlife Service. The proposed project would be a significant emitter of particulate matter (PM), beryllium (Be), carbon monoxide (CO), arsenic (As), and nitrogen oxides (NO_x). In addition, small amounts of sulfur dioxide (SO_2), volatile organic compounds (VOC), mercury (Hg), lead (Pb), and sulfuric acid mist (H_2SO_4) would be emitted. We are pleased to see that CFP would minimize SO_2 and H_2SO_4 emissions by burning natural gas as the primary fuel, and fuel oil with a maximum sulfur content of 0.05 percent as the backup fuel. This fuel choice allows CFP to avoid the Class I SO_2 increment consumption issue faced by new, high sulfur fuel-burning projects in the vicinity of the Chassahowitzka WA.

CFP proposes to further minimize emissions from the combustion turbine by using proper combustion controls, water injection, and advanced dry low-NO_x combustors. We agree that using proper combustion controls and burning a low sulfur fuel represent best available control technology (BACT) for PM, Be, As, CO, VOC, SO_2, and H_2SO_4. For NO_x, we still believe that either dry low-NO_x combustors, or water injection in combination with Selective Catalytic Reduction (SCR), is BACT for new combined cycle combustion turbine projects. Dry low-NO_x combustors can reduce NO_x levels to less than 15 parts per million (ppm) when firing natural gas, while SCR can achieve flue gas NO_x concentrations as low as 6 ppm when burning gas and 9 ppm when burning oil.

→ P 3/31

Check Sheet

Company Name: Central Florida Power LP ~~Hospitality~~
Permit Number: AC-53-214903
PSD Number:
County: Polk PSD-FL-190
Permit Engineer:
Others involved: Teresa

DER letter 7/14/92 ?

Application:
- [x] Initial Application
- [x] Incompleteness Letters
- [x] Responses
- [ ] Final Application (if applicable)
- [x] Waiver of Department Action
- [ ] Department Response

Intent:
- [ ] Intent to Issue
- [x] Notice to Public
- [x] Technical Evaluation
- [x] BACT Determination
- [ ] Unsigned Permit

Attachments:
- [ ]
- [ ]
- [ ]

- [ ] Correspondence with:
  - [x] EPA
  - [ ] Park Services
  - [ ] County
  - [ ] Other
- [x] Proof of Publication
- [ ] Petitions - (Related to extensions, hearings, etc.)

Final Determination:
- [ ] Final Determination
- [x] Signed Permit
- [x] BACT Determination

Post Permit Correspondence:
- [ ] Extensions
- [x] Amendments/Modifications
- [ ] Response from EPA
- [ ] Response from County
- [ ] Response from Park Services

- [x] Other

It is evident that the BACT process is driving emissions from combustion turbines downward, and that applicants are looking for ways to inherently lower emissions, rather than opting for add-on flue gas cleaning technologies. The advantages of this approach are obvious. For example, with dry low-NO_x combustors, the potential problems often cited with SCR (i.e., ammonia slip, disposal of spent catalyst, accidental release of stored ammonia, etc.) would not be a factor. Assuming this process continues, and inherently lower emitting systems are developed, such an approach may be preferred from a total environmental standpoint.

Regardless of which control technology is used, we believe that permit conditions should reflect the minimum achievable NO_x emission rates. The Technical Evaluation and Preliminary Determination document for the Tiger Bay project mentions that General Electric (GE) is developing processes, using either steam/water injection or dry-low NO_x combustor technology, to achieve a NO_x control level of 15 ppm when firing natural gas. Accordingly, the FDER proposes to accept CFP's low-NO_x burner design with a maximum NO_x emission limit of 25 ppm (while burning gas) until December 31, 1997. After that date, the maximum permitted limit would be lowered to 15 ppm. In fact, it is our understanding that GE is hoping to design combustors that achieve an even lower rate, 9 ppm. Therefore, while we do not object to the FDER allowing CFP to emit at the 25 ppm NO_x rate until GE develops the combustors, we feel that draft permit condition Number 15 should be revised. As written now, it suggests that SCR <u>may be</u> required if the lower NO_x emission limit of 15 ppm cannot be met. We recommend that this permit condition require CFP to install SCR if the dry low-NO_x combustors cannot meet the 15 ppm rate, and also that it include the statement that the FDER may revise and lower the allowable BACT limit to less than 15 ppm if such a lower rate is achievable.

Regarding CFP's analyses of Tiger Bay's potential impacts on the Chassahowitzka WA, CFP performed a Level I VISCREEN analysis and showed that there would be low potential for plume impacts in the wilderness area. In addition, CFP addressed potential effects on aquatic and terrestrial resources in the Chassahowitzka WA from increased nitrogen input. As we discussed in detail in our recent letter on the Kissimmee project, we are concerned about increased nitrogen input into the wilderness area and potential problems associated with nutrient enrichment in the aquatic ecosystem. However, because CFP's modeling shows that the annual average nitrogen dioxide impacts in the wilderness area from the Tiger Bay facility alone would be 0.014 micrograms per cubic meter (ug/m^3), less than our proposed significant impact level of 0.025 ug/m^3, we would not expect the project to contribute significantly to this problem.

If you have any questions regarding this matter, please contact Ms. Tonnie Maniero of our Air Quality office in Denver at 303/969-2071.

Sincerely yours,

Harold W Bennett

for James W. Pulliam, Jr.
Regional Director

cc: J. Hayes
C. Hylladay, SW Dust
B. Thomas, SW Dust
G. Bumgarner, NPS
L. Novak, Polk Co.
K. Kasky, KBN
G. Harper, EPA

P 230 524 382

Receipt for Certified Mail

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

Sent to: Mr. Robert S. Chatam, P.E.	
Street and No.: 2500 Citywest Blvd.	
P.O., State and ZIP Code: P.O. Box 4411 Houston TX	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date: mailed - 8/10/93 Permit No. - AC53-214903, PSD-FL-190	

PS Form **3800**, June 1991

Is your RETURN ADDRESS completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- 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. Robert S. Chatam, P.E.
DESTEC ENERGY, INC.
2500 Citywest Blvd., Suite 150
P. O. Box 4411
Houston, Texas 77210-4411

4a. Article Number
P 230524382

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

7. Date of Delivery
AUG 13 1993

5. Signature (Addressee)

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

6. Signature (Agent) C. Tabb

PS Form **3811**, December 1991 ★U.S. GPO: 1992—323-402 **DOMESTIC RETURN RECEIPT**

Thank you for using Return Receipt Service.

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

August 5, 1993

Mr. Robert S. Chatam, P.E.
DESTEC ENERGY, INC.
2500 Citywest Blvd., Suite 150
P.O. Box 4411
Houston, Texas 77210-4411

Dear Mr. Chatam:

RE: Central Florida Power L.P.
Permit No. **AC**53-214903, PSD -FL-190

The Department is in receipt of your letter dated July 30, 1993 regarding several design changes to your proposed Tiger Bay Cogeneration facility.

We have reviewed your letter and have no adverse comments. An "as built" plot and site plan should be included with the Certificate of Completion when you apply for an operation permit for this facility. Thank you for the opportunity to review and comment on this letter.

Sincerely,

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

CHF/TH/bjb

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

October 11, 1993

Mr. Kennard F. Kosky, P.E.
President
KBN Engineering and Applied Sciences, Inc.
1034 N.W. 57th Street
Gainesville, Florida 32605

Dear Mr. Kosky:

This in response to your recent letter notifying the Department of a design change for the Tiger Bay Cogeneration Facility (PSD-FL-190) consisting of a lower operating load of 60 percent. This design change will neither increase emissions nor result in a substantially different ambient impact. This operation will have no impact as far as the construction permit emission limits are concerned. Consequently, a construction permit modification is not required for this design change. However, it is required that this and all other substantive changes in the final design and construction be reported in the operation permit application.

If you have further questions, please contact Preston Lewis, Teresa Heron or Cleve Holladay at (904-488-1344).

Sincerely,

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

CHF/CH

cc: Robert Chatham, Destec Energy, Inc.
Robert I. Taylor, Tiger Bay L.P.
Bill Thomas, SWD

KBN

January 30, 1993

Mr. Clair H. Fancy
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RECEIVED

FEB 0 1 1993

Division of Air
Resources Management

Re: Central Florida Power Limited Partnership
Tiger Bay Cogeneration Plant
PSD-FL-190
AC 53-214903

Dear Mr. Fancy:

After review of the Technical Evaluation and Preliminary Determination (TEPD) for this project, dated January 15, 1993, several items in the draft permit were discussed with Ms. Teresa Heron for clarifications or corrections. These items, which were sent by facsimile to Teresa on January 21, 1993, are included as an attachment to this letter. From those discussions, the revisions, which were not considered significant by Teresa, are summarized as follows:

1. Specific Condition No. 5, page 5 of 10, TEPD- the operating parameters are for the 184 MW Combustion Turbine. Therefore, the wording, 74 MW Steam Turbine, can be eliminated from the heading.

2. Specific Condition No. 8, page 7 of 10, TEPD- Method 201, Method 12, Method 101A, and Method 8, as referenced, are either not applicable or were inadvertantly inserted in this condition. These methods should be deleted.

Method 202, Determination of Condensible Particulate Emissions from Stationary Sources, should be inserted and will be used with Method 201A.

3. Specific Condition No. 9, page 7 of 10, TEPD- Method 201A and Method 201 are listed for determining the initial compliance status of particulate matter emissions. This should be changed to Method 201A and Method 202.

4. Specific Condition No. 13, page 7 of 10, TEPD- Reference to the "proposed" NOx standard should be revised to the "NSPS" NOx standard since the standard is a final regulation.

12018-0400

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL PACKAGE TRACKING NUMBER 102822362

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Date 1-30-93

From (Your Name) Please Print: BERT MCCANN/K. KOSKY

Your Phone Number (Very Important): (904) 331-9000

Company: ENG & APPLIED SCIENCES

Department/Floor No.:

Street Address: 4 NW 57TH ST

City: GAINESVILLE State: FL ZIP Required: 32605

YOUR INTERNAL BILLING REFERENCE INFORMATION (First 24 characters will appear on invoice.): 2018-0400

To (Recipient's Name) Please Print: CLAIR FANCY

Recipient's Phone Number (Very Important): (904) 488-1344

Company: FLORIDA DEPT. OF ENVIRON. REGUL

Department/Floor No.:

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.): 2600 BLAIR STONE RD, TWIN TOWERS OFFICE

City: TALLAHASSEE State: FL ZIP Required: 32399-2400

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City: State: ZIP Required:

3 PAYMENT 1 [✓] Bill Sender 2 [ ] Bill Recipient's FedEx Acct No 3 [ ] Bill 3rd Party FedEx Acct No 4 [ ] Bill Credit Card 5 [ ] Cash/Check

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning†)	Standard Overnight (Delivery by next business afternoon†)
11 [ ] YOUR PACKAGING	51 [ ] YOUR PACKAGING
16 [ ] FEDEX LETTER *	56 [✓] FEDEX LETTER *
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14 [ ] FEDEX TUBE	54 [ ] FEDEX TUBE
Economy Two-Day (Delivery by second business day†)	**Government Overnight** (Reserved for authorized users only)
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	41 [ ] GOVT PACKAGE

Freight Service (for Extra Large or any package over 150 lbs.)

70 [ ] OVERNIGHT FREIGHT ** (Confirmed reservation required)

80 [ ] TWO-DAY FREIGHT **

†Delivery commitment may be later in some areas.

*Declared Value Limit $100

**Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

1 [ ] HOLD FOR PICK-UP (Fill in Box H) [✓] DELIVER WEEKDAY

2

3 DELIVER SATURDAY (Extra charge) (Not available to all locations) [ ]

4 [ ] DANGEROUS GOODS (Extra charge)

5 [ ]

6 [ ] DRY ICE ____ Lbs

7 [ ] OTHER SPECIAL SERVICE

8 [ ]

9 [ ] SATURDAY PICK-UP (Extra charge)

10 [ ]

11 [ ] DESCRIPTION

12 [ ] HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT in Pounds (Only)
1	
Total 1	Total

DIM SHIPMENT (Chargeable Weight)

[ ] ____ lbs.

____ x ____ x ____ = ____

Received At

1 [ ] Regular Stop 3 [ ] Drop Box

2 [ ] On-Call Stop 4 [ ] BSC 5 [ ] Station

7

Release Signature: X

FedEx Emp. No. Date/Time

H

Emp. No Date

[ ] Cash Received

[ ] Return Shipment

[ ] Third Party [ ] Chg. To Del [ ] Chg. To Hold

Street Address

City State Zip

Received By: X

Date/Time Received FedEx Employee Number

Federal Express Use

Base Charges

Declared Value Charge

Other 1

Other 2

Total Charges

REVISION DATE 4/91
PART #137204 FXEM 6/91
FORMAT #082

082

5. Table 1, TEPD- Several corrections regarding the emission rates and wording:

   a. For CO(CT), oil- change 98 lbs/hr to 98.4 lbs/hr
   b. For opacity, oil- insert footnote D
   c. For Hg, As, Be, Pb- include emission rate in lb/hr and TPY
   d. For Hg, As, Be, Pb- change factor of 10^{-12} to 10^{-6}
   e. In footnote A- delete No. 2 in reference to distillate oil
   f. In footnote B- include emission rate of 97.2 lb/hr in reference to the NOx emission limit of 15 ppmvd; 15 ppmv should be ppmvd

6. Best Available Control Technology (BACT) Determination, Table on page 9:

   a. For NOx(CT)- include lb/hr emission rates and correct ppmv to ppmvd
   b. For CO(CT)- change 98 lbs/hr to 98.4 lbs/hr
   c. For Hg, As, Be, Pb- include emission rate in lb/hr and TPY
   d. For Hg, As, Be, Pb- change factor of 10^{-12} to 10^{-6}
   e. In footnote b- delete No. 2 in reference to distillate oil
   f. in footnote c- change 8460 hours per year to 8760
   g. in footnote c- delete 300 hours per year and insert 3,742,327 gallons per calendar year

Items that remained as issues to be addressed include the following.

1. The PM10 emission limits for the CT firing natural gas and oil are currently expressed in units of lbs/MMBtu. However, based on the manufacturer's guarantee, the emission limits were presented in the application in units of lb/hr (see recommended changes in Table 1 of the TEPD; page 3 and table on page 9 of the BACT Determination). As shown in the attached KBN Table 1, the PM emission rate may exceed 0.01 lbs/MMBtu for oil-firing at base load and high temperature conditions and at 70 percent load for the range of temperatures. Although the emission limit of 0.01 lbs/MMBtu is based on base load and ambient temperature of 27 °F in the tables, the text does not mention the operating condition or temperature. To avoid this potential confusion, it is recommended that the CT emission limit for firing natural gas and fuel oil be expressed as 9 and 17 lb/hr, respectively.

2. On page 7 of the BACT Determination, it is stated that General Electric (GE) is currently developing programs using both steam/water injection and dry low NOx combustor to achieve NOx emission control level of 9 ppm when firing natural gas. From recent discussions with GE, it is our undersatnding that the emission control level that they are attempting to achieve is 15 ppm.

3. To be consistent with emission rates presented for most pollutants, it is recommended that the limits for sulfuric acid mist (H_2SO_4) should be expressed to 3 three significant digits (see Table 1 of the TEPD and the table on page 9 of the BACT Determination.

KBN

We appreciate your efforts in preparing the draft permit and reviewing our comments. Please call me if there any further questions on the material submitted.

Sincerely,

Kennard F. Kosky

Kennard F. Kosky, P.E.
President

Enclosure

cc: Robert I. Taylor, Central Florida Power, L.P.
Robert Chatham, Destec Energy, Inc.
Teresa Heron, FDER
C. Holladay

12018-0400

P 062 922 005

Receipt for Certified Mail

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Do not use for International Mail
(See Reverse)

Sent to Mr. Robert I. Taylor,	
Street and No. Central FL Power 2500 City West Blvd.	
P.O., State and ZIP Code Houston, TX 77042	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date Mailed: 10-9-92 Permit: AC 53-214903 PSD-FL-190	

PS Form 3800, June 1991

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- 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 Fee will provide you the signature of the person delivered to and the date of delivery.

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. Robert I. Taylor, Proj. Mgr.
Central Florida Power, L.P.
2500 City West Blvd., Suite 150
Houston, TX 77042

4a. Article Number P 062 922 005

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

7. Date of Delivery 10-13-92

5. Signature (Addressee)

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

6. Signature (Agent) K. Chatman

PS Form 3811, November 1990 ~~*U.S. GPO: 1991—287-066~~ **DOMESTIC RETURN RECEIPT**

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

October 9, 1992

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Robert I. Taylor, Project Manager
Central Florida Power, L.P.
2500 City West Blvd., Suite 150
Houston, Texas 77042

Dear Mr. Taylor:

This letter is to confirm the Department's conversation with Mr. Ken Kosky that additional information (updated process flow diagram showing the volumetric flow rates) is needed to complete your application for permit to construct the Tiger Bay Cogeneration Plant (File No. AC53-214903/PSD-FL-190). We are working directly with Mr. Kosky to obtain the needed information and will resume processing this application when it is complete.

If you have any questions on this matter, please write to me or call Mirza Baig, review engineer, at (904) 488-1344.

Sincerely,

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

CHF/MB/plm

cc: Ken Kosky, KBN
B. Thomas, SW Dist.
G. Harper, EPA
B. Mitchell, NPS

DESTEC ENGINEERING

DESTEC ENGINEERING, INC.
2500 CITYWEST BLVD., SUITE 150
P. O. BOX 4411
HOUSTON, TEXAS 77210-4411
(713) 735-4000

October 23, 1992

Mr. G. Preston Lewis, P.E.
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Central Florida Power Limited Partnership
Tiger Bay cogeneration plant
PSD-FL-190
AC 53-214903

Dear Mr. Lewis,

Per our conversation on October 22, I want to personally thank you for your involvement and decision to determine our application as administratively complete as of October 9, 1992 and your commitment to issue the draft permit by December 9, 1992. KBN and I look forward to working with Mr. Mirza Baig and your department in the review and processing of our application and final issuance of the permit.

Please call me at (713) 735-4087 should you or your department have questions or comments about our application.

Sincerely,

Robert S. Chatham, P.E.
Senior Environmental Engineer

RSC:tk

plewis.WPR

cc:Mr. Mirza Baig - FDER, Tallahassee

RECEIVED
OCT 26 1992
Division of Air
Resources Management

KBN

October 9, 1992

Mr. Clair H. Fancy, Chief
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mirza Baig

RE: Central Florida Power Limited Partnership
Tiger Bay (formerly Central Florida) Cogeneration Plant
PSD-FL-190
AC 53-214903

Dear Mirza:

As we discussed today, we will be sending to you information relating to the volumetric flow rates in the process flow diagrams sent in our letter of August 26, 1992.

Sincerely,

Kennard F. Kosky, P.E.
Principal Engineer

KFK/mlb

RECEIVED
OCT 16 1992
Division of Air
Resources Management

Mirza.ltr/Kosky

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

September 9, 1992

Mr. Clair H. Fancy, Chief
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Central Florida Power Limited Partnership
Tiger Bay (formerly Central Florida) Cogeneration Plant
PSD-FL-190
AC 53-214903

Dear Mr. Fancy:

This correspondence presents a clarification of Attachment 1, Manufacturer's Design Specifications for the Combustion Turbine, provided in my letter of August 26, 1992, and discussed between Mr. Robert McCann, KBN, and Mirza Baig on August 27, 1992. In that attachment, design specifications were given for GE PG7221(FA) and Westinghouse 501F combustion turbines. In August, more recent information was obtained, and the Westinghouse data are slightly different from the information presented in the permit application submitted on June 12, 1992.

As shown in Tables 1 through 4, the changes in maximum emission rates for the Westinghouse turbine are minor and generally are within approximately 2 percent of the rates specified in the permit application (see Tables 5 through 8). The emission rates for other regulated and non-regulated pollutants increase slightly due to the slight increase in the heat input rate (i.e., MMBtu/hr) which generally is the basis of the emission factor for those pollutants. Comparisons of the maximum emissions for the Westinghouse and GE turbines as presented in the permit application and for the revised Westinghouse turbine are presented in Tables 9 through 12. As shown, the emission data, in tons per year (TPY), for the GE machine at 72°F ambient temperature are higher for all pollutants except VOC when compared to the Westinghouse data. The revised maximum VOC emission rate for the Westinghouse turbine is slightly higher than that presented in the permit application (45.6 TPY compared to 45.3 TPY).

Table 3-1 from the support document to the PSD permit application has been revised to reflect the worst-case emission rates for each pollutant from either turbine. The worst-case emission rates are used to determine pollutant applicability under PSD regulations by comparing the maximum allowable emissions for the project to the PSD significant emission rates.

The modeling analysis presented as part of the permit application also does not significantly change and still provides a conservative estimate of short-term and annual impacts. The impacts were based on the the worst-case emission rates from either the GE emission data or the previous Westinghouse emission data which are still higher than the updated Westinghouse emission data.

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

KBN

Therefore, the updated design specifications for the Westinghouse turbine are not a significant change from the material presented in the original application and should not materially affect any conclusions drawn from original application.

Please call me if there any further questions on the material submitted.

Sincerely,

Kennard F. Kosky

Kennard F. Kosky, P.E.
President

KFK/dmpm

Enclosure

cc: Robert I. Taylor, Central Florida Power, L.P.
Robert Chatham, Destec Engineering, Inc.
Mirza Baig, FDER
File (2)
C. Holladay
B. Thomas, SW Dist
J. Harper, EPA
B. Mitchell, WPS

Table 3-1. Net Increase in Emissions Due To the Central Florida Cogeneration Facility Compared to the PSD Significant Emission Rates (REVISED)

Pollutant	Emissions (TPY) Potential Emissions From Proposed Facility[a] Permit Application		Revised		Significant Emission Rate	PSD Review
Sulfur Dioxide[b]	33.1	(GE)	33.1	(GE)	40	No
Particulate Matter (TSP)	45.0	(GE)	45.0	(GE)	25	Yes
Particulate Matter (PM10)	45.0	(GE)	45.0	(GE)	15	Yes
Nitrogen Dioxide	702.1	(GE)	702.1	(GE)	40	Yes
Carbon Monoxide	243.1	(GE)	243.1	(GE)	100	Yes
Volatile Organic Compounds	45.3	(W)	45.6	(W)	40	Yes
Lead	0.00219	(GE)	0.00219	(GE)	0.6	No
Sulfuric Acid Mist	4.2	(GE)	4.2	(GE)	7	No
Total Fluorides	0.00802	(GE)	0.00802	(GE)	3	No
Total Reduced Sulfur	NEG		NEG		10	No
Reduced Sulfur Compounds	NEG		NEG		10	No
Hydrogen Sulfide	NEG		NEG		10	No
Asbestos	NEG		NEG		0.007	No
Beryllium	0.000616	(GE)	0.000616	(GE)	0.0004	Yes
Mercury	0.000739	(GE)	0.000739	(GE)	0.1	No
Vinyl Chloride	NEG		NEG		1	No
Benzene	NEG		NEG		0	No
Radionuclides	NEG		NEG		0	No
Inorganic Arsenic	0.00104	(GE)	0.00104	(GE)	0	Yes

Note: GE = General Electric.
NEG = Negligible.
W = Westinghouse.

All calculations based on 72°F base load condition.

[a] Maximum annual emissions based on the gas turbine firing distillate oil and natural gas for 300 and 8,460 hours, respectively, and duct burner firing natural gas for 8,760 hours. Tables A-15 through A-18 present emissions for the GE machine while Tables A-33 through A-36 present emissions for the Westinghouse machine.

[b] Based on a maximum sulfur content specification of 0.05 percent in fuel oil.

Table 1. Difference in Maximum Emissions for Criteria Pollutants for Tiger Bay Cogeneration Facility- Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Hours of Operation		300			8460			8760				
Particulate:												
lb/hr	-9.00E-01	-1.00E-01	0.00E+00	2.00E-01	1.00E-01	1.00E-01	0.00E+00	0.00E+00	0.00E+00	-9.00E-01	-1.00E-01	0.00E+00
TPY	-1.35E-01	-1.50E-02	0.00E+00	8.46E-01	4.23E-01	4.23E-01	0.00E+00	0.00E+00	0.00E+00	7.11E-01	4.08E-01	4.23E-01
Sulfur Dioxide:												
lb/hr	-1.70E+00	-7.94E-01	-6.95E-01	3.93E-02	3.78E-02	3.64E-02	0.00E+00	0.00E+00	0.00E+00	-1.70E+00	-7.94E-01	-6.95E-01
TPY	-2.55E-01	-1.19E-01	-1.04E-01	1.66E-01	1.60E-01	1.54E-01	0.00E+00	0.00E+00	0.00E+00	-8.86E-02	4.06E-02	4.95E-02
Nitrogen Oxides:												
lb/hr	-7.98E-01	4.82E+00	4.27E+00	-6.21E+00	2.49E+00	2.69E+00	0.00E+00	0.00E+00	0.00E+00	-7.98E-01	4.82E+00	4.27E+00
TPY	-1.20E-01	7.22E-01	6.40E-01	-2.63E+01	1.05E+01	1.14E+01	0.00E+00	0.00E+00	0.00E+00	-2.64E+01	1.13E+01	1.20E+01
Carbon Monoxide:												
lb/hr	-2.58E+00	1.36E+00	1.67E+00	1.27E+00	2.70E-01	2.65E-01	0.00E+00	0.00E+00	0.00E+00	-2.58E+00	1.36E+00	1.67E+00
TPY	-3.87E-01	2.05E-01	2.51E-01	5.37E+00	1.14E+00	1.12E+00	0.00E+00	0.00E+00	0.00E+00	4.98E+00	1.34E+00	1.37E+00
VOCs (as methane):												
lb/hr	-1.21E-01	1.59E-01	1.62E-01	6.16E-02	6.13E-02	6.39E-02	0.00E+00	0.00E+00	0.00E+00	-1.21E-01	1.59E-01	1.62E-01
TPY	-1.82E-02	2.38E-02	2.43E-02	2.61E-01	2.59E-01	2.70E-01	0.00E+00	0.00E+00	0.00E+00	2.43E-01	2.83E-01	2.94E-01
Lead:												
lb/hr	4.54E-06	1.37E-04	1.37E-04	NA	NA	NA	NA	NA	NA	4.54E-06	1.37E-04	1.37E-04
TPY	6.81E-07	2.06E-05	2.05E-05	NA	NA	NA	NA	NA	NA	6.81E-07	2.06E-05	2.05E-05

Note: NA = not applicable

Table 2. Difference in Maximum Emissions of Other Regulated Pollutants for Tiger Bay Cogeneration Facility
Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant		Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Arsenic	lb/hr	2.14E-06	6.47E-05	6.44E-05	NA	NA	NA	NA	NA	NA	2.14E-06	6.47E-05	6.44E-05
	TPY	3.21E-07	9.71E-06	9.67E-06	NA	NA	NA	NA	NA	NA	3.21E-07	9.71E-06	9.67E-06
Beryllium	lb/hr	1.27E-06	3.85E-05	3.84E-05	NA	NA	NA	NA	NA	NA	1.27E-06	3.85E-05	3.84E-05
	TPY	1.91E-07	5.78E-06	5.75E-06	NA	NA	NA	NA	NA	NA	1.91E-07	5.78E-06	5.75E-06
Mercury	lb/hr	1.53E-06	4.62E-05	4.60E-05	NA	NA	NA	NA	NA	NA	1.53E-06	4.62E-05	4.60E-05
	TPY	2.29E-07	6.94E-06	6.91E-06	NA	NA	NA	NA	NA	NA	2.29E-07	6.94E-06	6.91E-06
Fluoride	lb/hr	1.66E-05	5.01E-04	4.99E-04	NA	NA	NA	NA	NA	NA	1.66E-05	5.01E-04	4.99E-04
	TPY	2.49E-06	7.52E-05	7.49E-05	NA	NA	NA	NA	NA	NA	2.49E-06	7.52E-05	7.49E-05
Sulfuric Acid Mist	lb/hr	-2.08E-01	-9.73E-02	-8.52E-02	5.07E-03	4.87E-03	4.69E-03	0.00E+00	0.00E+00	0.00E+00	-2.08E-01	-9.73E-02	-8.52E-02
	TPY	-3.12E-02	-1.46E-02	-1.28E-02	2.14E-02	2.06E-02	1.98E-02	0.00E+00	0.00E+00	0.00E+00	-9.78E-03	6.01E-03	7.06E-03

Note: NA = not applicable

Table 3. Difference in Maximum Emissions of Non-Regulated Pollutants for Tiger Bay Cogeneration Facility- Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant		Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Manganese	lb/hr	7.14E-06	2.16E-04	2.15E-04	NA	NA	NA	NA	NA	NA	7.14E-06	2.16E-04	2.15E-04
	TPY	1.07E-06	3.24E-05	3.22E-05	NA	NA	NA	NA	NA	NA	1.07E-06	3.24E-05	3.22E-05
Nickel	lb/hr	8.67E-05	2.62E-03	2.61E-03	NA	NA	NA	NA	NA	NA	8.67E-05	2.62E-03	2.61E-03
	TPY	1.30E-05	3.93E-04	3.91E-04	NA	NA	NA	NA	NA	NA	1.30E-05	3.93E-04	3.91E-04
Cadmium	lb/hr	5.35E-06	1.62E-04	1.61E-04	NA	NA	NA	NA	NA	NA	5.35E-06	1.62E-04	1.61E-04
	TPY	8.03E-07	2.43E-05	2.42E-05	NA	NA	NA	NA	NA	NA	8.03E-07	2.43E-05	2.42E-05
Chromium	lb/hr	2.42E-05	7.32E-04	7.29E-04	NA	NA	NA	NA	NA	NA	2.42E-05	7.32E-04	7.29E-04
	TPY	3.63E-06	1.10E-04	1.09E-04	NA	NA	NA	NA	NA	NA	3.63E-06	1.10E-04	1.09E-04
Copper	lb/hr	1.43E-04	4.32E-03	4.30E-03	NA	NA	NA	NA	NA	NA	1.43E-04	4.32E-03	4.30E-03
	TPY	2.14E-05	6.47E-04	6.44E-04	NA	NA	NA	NA	NA	NA	2.14E-05	6.47E-04	6.44E-04
Vanadium	lb/hr	3.54E-05	1.07E-03	1.07E-03	NA	NA	NA	NA	NA	NA	3.54E-05	1.07E-03	1.07E-03
	TPY	5.32E-06	1.61E-04	1.60E-04	NA	NA	NA	NA	NA	NA	5.32E-06	1.61E-04	1.60E-04
Selenium	lb/hr	1.19E-05	3.61E-04	3.59E-04	NA	NA	NA	NA	NA	NA	1.19E-05	3.61E-04	3.59E-04
	TPY	1.79E-06	5.41E-05	5.39E-05	NA	NA	NA	NA	NA	NA	1.79E-06	5.41E-05	5.39E-05
Polycyclic Organic Matter	lb/hr	1.42E-07	4.28E-06	4.27E-06	1.45E-05	1.40E-05	1.35E-05	0.00E+00	0.00E+00	0.00E+00	1.45E-05	1.40E-05	1.35E-05
	TPY	2.13E-08	6.43E-07	6.40E-07	6.15E-05	5.91E-05	5.69E-05	0.00E+00	0.00E+00	0.00E+00	6.15E-05	5.98E-05	5.76E-05
Formaldehyde	lb/hr	2.07E-04	6.24E-03	6.21E-03	1.15E-03	1.11E-03	1.07E-03	0.00E+00	0.00E+00	0.00E+00	2.07E-04	6.24E-03	6.21E-03
	TPY	3.10E-05	9.36E-04	9.32E-04	4.87E-03	4.68E-03	4.51E-03	0.00E+00	0.00E+00	0.00E+00	4.90E-03	5.62E-03	5.44E-03

Note: NA = not applicable

Table 4. Difference in Maximum Emissions for Additional Non-Regulated Pollutant for Tiger Bay Cogeneration Facility- Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant		Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Antimony	lb/hr	1.11E-05	3.37E-04	3.35E-04	NA	NA	NA	NA	NA	NA	1.11E-05	3.37E-04	3.35E-04
	TPY	1.67E-06	5.05E-05	5.03E-05	NA	NA	NA	NA	NA	NA	1.67E-06	5.05E-05	5.03E-05
Barium	lb/hr	9.95E-06	3.01E-04	3.00E-04	NA	NA	NA	NA	NA	NA	9.95E-06	3.01E-04	3.00E-04
	TPY	1.49E-06	4.51E-05	4.49E-05	NA	NA	NA	NA	NA	NA	1.49E-06	4.51E-05	4.49E-05
Cobalt	lb/hr	4.62E-06	1.40E-04	1.39E-04	NA	NA	NA	NA	NA	NA	4.62E-06	1.40E-04	1.39E-04
	TPY	6.93E-07	2.10E-05	2.09E-05	NA	NA	NA	NA	NA	NA	6.93E-07	2.10E-05	2.09E-05
Zinc	lb/hr	3.48E-04	1.05E-02	1.05E-02	NA	NA	NA	NA	NA	NA	3.48E-04	1.05E-02	1.05E-02
	TPY	5.23E-05	1.58E-03	1.57E-03	NA	NA	NA	NA	NA	NA	5.23E-05	1.58E-03	1.57E-03
Chlorine	lb/hr	-8.22E-04	-3.88E-04	-3.36E-04	NA	NA	NA	NA	NA	NA	-8.22E-04	-3.88E-04	-3.36E-04
	TPY	-1.23E-04	-5.81E-05	-5.04E-05	NA	NA	NA	NA	NA	NA	-1.23E-04	-5.81E-05	-5.04E-05

Table 5. Percent Change in Maximum Emissions for Criteria Pollutants for Tiger Bay Cogeneration Facility-Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant	Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Hours of Operation		300			8460			8760				
Particulate:												
lb/hr	-2.23%	-0.26%	0.00%	3.12%	1.69%	1.79%	0.00%	0.00%	0.00%	-2.17%	-0.25%	0.00%
TPY	-2.23%	-0.26%	0.00%	3.13%	1.69%	1.79%	0.00%	0.00%	0.00%	1.90%	1.16%	1.26%
Sulfur Dioxide:												
lb/hr	-1.87%	-0.91%	-0.85%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	-1.86%	-0.91%	-0.84%
TPY	-1.87%	-0.91%	-0.85%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	-0.25%	0.13%	0.16%
Nitrogen Oxides:												
lb/hr	-0.27%	1.81%	1.72%	-3.67%	1.75%	2.02%	0.00%	0.00%	0.00%	-0.27%	1.74%	1.65%
TPY	-0.27%	1.81%	1.72%	-3.67%	1.75%	2.02%	0.00%	0.00%	0.00%	-3.29%	1.64%	1.87%
Carbon Monoxide:												
lb/hr	-1.58%	0.87%	1.14%	3.79%	0.87%	0.92%	0.00%	0.00%	0.00%	-1.49%	0.82%	1.07%
TPY	-1.58%	0.87%	1.14%	3.79%	0.87%	0.92%	0.00%	0.00%	0.00%	2.37%	0.68%	0.73%
VOCs (as methane):												
lb/hr	-0.64%	0.87%	0.94%	0.77%	0.87%	0.92%	0.00%	0.00%	0.00%	-0.56%	0.75%	0.81%
TPY	-0.64%	0.87%	0.94%	0.77%	0.87%	0.92%	0.00%	0.00%	0.00%	0.49%	0.63%	0.66%
Lead:												
lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%

Note: NA = not applicable

Table 6. Percent Change in Maximum Emissions of Other Regulated Pollutants for Tiger Bay Cogeneration Facility
Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant		Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Arsenic													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Beryllium													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Mercury													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Fluoride													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Sulfuric Acid Mist	lb/hr	-1.87%	-0.91%	-0.85%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	-1.86%	-0.91%	-0.84%
	TPY	-1.87%	-0.91%	-0.85%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	-0.22%	0.15%	0.18%

Note: NA = not applicable

Table 7. Percent Change in Maximum Emissions of Non-Regulated Pollutants for Tiger Bay Cogeneration Facility-Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant		Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Manganese	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Nickel	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Cadmium	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Chromium	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Copper	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Vanadium	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Selenium	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Polycyclic Organic Matter	lb/hr	0.03%	1.00%	1.07%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	0.77%	0.83%	0.85%
	TPY	0.03%	1.00%	1.07%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	0.76%	0.83%	0.85%
Formaldehyde	lb/hr	0.03%	1.00%	1.07%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	0.03%	0.99%	1.05%
	TPY	0.03%	1.00%	1.07%	0.82%	0.88%	0.91%	0.00%	0.00%	0.00%	0.67%	0.85%	0.88%

Note: NA = not applicable

Table 8. Percent Change in Maximum Emissions for Additional Non-Regulated Pollutant for DESTEC Central Florida Cogeneration Facility- Westinghouse 501F, Base Load, Permit Application Compared to Revised Values

Pollutant		Gas Turbine- Distillate Oil			Gas Turbine- Natural Gas			Duct Burner- Natural Gas			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Antimony													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Barium													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Cobalt													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Zinc													
	lb/hr	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
	TPY	0.03%	1.00%	1.07%	NA	NA	NA	NA	NA	NA	0.03%	1.00%	1.07%
Chlorine													
	lb/hr	-1.87%	-0.91%	-0.85%	NA	NA	NA	NA	NA	NA	-1.87%	-0.91%	-0.85%
	TPY	-1.87%	-0.91%	-0.85%	NA	NA	NA	NA	NA	NA	-1.87%	-0.91%	-0.85%

Table 9. Comparison of Maximum Emissions for Criteria Pollutants for Tiger Bay Cogeneration Facility-Permit Application for GE and Westinghouse Turbines and Revised Westinghouse Data, Base Load

Pollutant	Permit Application GE PG7221(FA)			Permit Application Westinghouse 501F			Revised Data Westinghouse 501F		
	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Particulate:									
lb/hr	18.00	18.00	18.00	41.40	40.10	37.70	40.50	40.00	37.70
TPY	45.00	45.00	45.00	37.51	35.20	33.57	38.22	35.61	34.00
Sulfur Dioxide:									
lb/hr	100.02	88.87	82.11	91.35	87.31	82.32	89.65	86.52	81.63
TPY	36.82	33.05	30.74	35.24	32.46	30.52	35.15	32.50	30.57
Nitrogen Oxides:									
lb/hr	336.22	300.19	278.04	300.93	276.05	258.65	300.13	280.87	262.92
TPY	777.46	702.11	655.15	802.48	685.75	644.03	776.09	697.01	656.07
Carbon Monoxide:									
lb/hr	108.41	98.62	93.20	173.49	167.04	156.99	170.91	168.40	158.66
TPY	265.12	243.12	230.91	209.97	198.55	187.82	214.95	199.90	189.19
VOCs (as methane):									
lb/hr	10.40	9.48	9.40	21.76	21.18	20.06	21.64	21.34	20.22
TPY	25.63	24.46	23.66	49.53	45.29	44.66	49.77	45.57	44.95
Lead:									
lb/hr	1.65E-02	1.46E-02	1.35E-02	1.42E-02	1.37E-02	1.28E-02	1.42E-02	1.38E-02	1.29E-02
TPY	2.47E-03	2.19E-03	2.03E-03	2.13E-03	2.05E-03	1.91E-03	2.13E-03	2.07E-03	1.94E-03

Note: Based on firing natural gas and distillate oil for 8470 and 300 hours, respectively.
Total emissions include emissions from the combustion turbine and duct burner.

Table 10. Comparison of Maximum Emissions of Other Regulated Pollutants for Tiger Bay Cogeneration Facility-Permit Application for GE and Westinghouse Turbines and Revised Westinghouse Data, Base Load

Pollutant		Maximum Emissions			Maximum Emissions			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Arsenic	lb/hr	7.77E-03	6.90E-03	6.37E-03	6.70E-03	6.45E-03	6.02E-03	6.70E-03	6.52E-03	6.09E-03
	TPY	1.17E-03	1.04E-03	9.56E-04	1.01E-03	9.68E-04	9.04E-04	1.01E-03	9.78E-04	9.13E-04
Beryllium	lb/hr	4.62E-03	4.11E-03	3.79E-03	3.99E-03	3.84E-03	3.59E-03	3.99E-03	3.88E-03	3.62E-03
	TPY	6.94E-04	6.16E-04	5.69E-04	5.98E-04	5.76E-04	5.38E-04	5.98E-04	5.82E-04	5.44E-04
Mercury	lb/hr	5.55E-03	4.93E-03	4.55E-03	4.79E-03	4.61E-03	4.30E-03	4.79E-03	4.66E-03	4.35E-03
	TPY	8.32E-04	7.39E-04	6.83E-04	7.18E-04	6.91E-04	6.45E-04	7.18E-04	6.98E-04	6.52E-04
Fluoride	lb/hr	6.02E-02	5.35E-02	4.94E-02	5.19E-02	5.00E-02	4.67E-02	5.19E-02	5.05E-02	4.72E-02
	TPY	9.03E-03	8.02E-03	7.41E-03	7.79E-03	7.50E-03	7.00E-03	7.79E-03	7.57E-03	7.08E-03
Sulfuric Acid Mist	lb/hr	1.23E+01	1.09E+01	1.01E+01	1.12E+01	1.07E+01	1.01E+01	1.10E+01	1.06E+01	1.00E+01
	TPY	4.65E+00	4.18E+00	3.89E+00	4.46E+00	4.10E+00	3.86E+00	4.45E+00	4.11E+00	3.86E+00

Note: Based on firing natural gas and distillate oil for 8470 and 300 hours, respectively.
Total emissions include emissions from the combustion turbine and duct burner.

Table 11. Comparison of Maximum Emissions of Non-Regulated Pollutants for Tiger Bay Cogeneration Facility-Permit Application for GE and Westinghouse Turbines and Revised Westinghouse Data, Base Load

Pollutant		Maximum Emissions			Maximum Emissions			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Manganese	lb/hr	2.59E-02	2.30E-02	2.12E-02	2.23E-02	2.15E-02	2.01E-02	2.23E-02	2.17E-02	2.03E-02
	TPY	3.88E-03	3.45E-03	3.19E-03	3.35E-03	3.23E-03	3.01E-03	3.35E-03	3.26E-03	3.04E-03
Nickel	lb/hr	3.14E-01	2.79E-01	2.58E-01	2.71E-01	2.61E-01	2.44E-01	2.71E-01	2.64E-01	2.46E-01
	TPY	4.72E-02	4.19E-02	3.87E-02	4.07E-02	3.92E-02	3.66E-02	4.07E-02	3.96E-02	3.70E-02
Cadmium	lb/hr	1.94E-02	1.73E-02	1.59E-02	1.68E-02	1.61E-02	1.51E-02	1.68E-02	1.63E-02	1.52E-02
	TPY	2.91E-03	2.59E-03	2.39E-03	2.51E-03	2.42E-03	2.26E-03	2.51E-03	2.44E-03	2.28E-03
Chromium	lb/hr	8.79E-02	7.80E-02	7.21E-02	7.58E-02	7.30E-02	6.81E-02	7.58E-02	7.37E-02	6.89E-02
	TPY	1.32E-02	1.17E-02	1.08E-02	1.14E-02	1.09E-02	1.02E-02	1.14E-02	1.11E-02	1.03E-02
Copper	lb/hr	5.18E-01	4.60E-01	4.25E-01	4.47E-01	4.30E-01	4.02E-01	4.47E-01	4.35E-01	4.06E-01
	TPY	7.77E-02	6.90E-02	6.37E-02	6.70E-02	6.45E-02	6.02E-02	6.70E-02	6.52E-02	6.09E-02
Vanadium	lb/hr	1.29E-01	1.14E-01	1.05E-01	1.11E-01	1.07E-01	9.97E-02	1.11E-01	1.08E-01	1.01E-01
	TPY	1.93E-02	1.71E-02	1.58E-02	1.66E-02	1.60E-02	1.50E-02	1.66E-02	1.62E-02	1.51E-02
Selenium	lb/hr	4.33E-02	3.85E-02	3.55E-02	3.74E-02	3.60E-02	3.36E-02	3.74E-02	3.63E-02	3.40E-02
	TPY	6.50E-03	5.77E-03	5.33E-03	5.60E-03	5.40E-03	5.04E-03	5.61E-03	5.45E-03	5.09E-03
Polycyclic Organic Matter	lb/hr	1.91E-03	1.73E-03	1.61E-03	1.88E-03	1.69E-03	1.59E-03	1.90E-03	1.71E-03	1.60E-03
	TPY	8.17E-03	7.38E-03	6.90E-03	8.05E-03	7.25E-03	6.80E-03	8.11E-03	7.31E-03	6.86E-03
Formaldehyde	lb/hr	7.58E-01	6.74E-01	6.23E-01	6.55E-01	6.31E-01	5.90E-01	6.55E-01	6.37E-01	5.96E-01
	TPY	7.53E-01	6.79E-01	6.33E-01	7.29E-01	6.62E-01	6.21E-01	7.34E-01	6.68E-01	6.26E-01

Note: Based on firing natural gas and distillate oil for 8470 and 300 hours, respectively.
Total emissions include emissions from the combustion turbine and duct burner.

Table 12. Comparison of Maximum Emissions for Additional Non-Regulated Pollutant for Tiger Bay Facility-Permit Application for GE and Westinghouse Turbines and Revised Westinghouse Data, Base Load

Pollutant		Maximum Emissions			Maximum Emissions			Maximum Emissions		
		27 oF	72 oF	97 oF	27 oF	72 oF	97 oF	27 oF	72 oF	97 oF
Antimony										
	lb/hr	4.04E-02	3.59E-02	3.32E-02	3.49E-02	3.36E-02	3.13E-02	3.49E-02	3.39E-02	3.17E-02
	TPY	6.06E-03	5.38E-03	4.97E-03	5.23E-03	5.03E-03	4.70E-03	5.23E-03	5.09E-03	4.75E-03
Barium										
	lb/hr	3.61E-02	3.21E-02	2.96E-02	3.11E-02	3.00E-02	2.80E-02	3.12E-02	3.03E-02	2.83E-02
	TPY	5.42E-03	4.81E-03	4.44E-03	4.67E-03	4.50E-03	4.20E-03	4.67E-03	4.54E-03	4.25E-03
Cobalt										
	lb/hr	1.68E-02	1.49E-02	1.38E-02	1.45E-02	1.39E-02	1.30E-02	1.45E-02	1.41E-02	1.31E-02
	TPY	2.51E-03	2.23E-03	2.06E-03	2.17E-03	2.09E-03	1.95E-03	2.17E-03	2.11E-03	1.97E-03
Zinc										
	lb/hr	1.26E+00	1.12E+00	1.04E+00	1.09E+00	1.05E+00	9.80E-01	1.09E+00	1.06E+00	9.91E-01
	TPY	1.90E-01	1.68E-01	1.56E-01	1.64E-01	1.57E-01	1.47E-01	1.64E-01	1.59E-01	1.49E-01
Chlorine										
	lb/hr	4.99E-02	4.43E-02	4.09E-02	4.41E-02	4.24E-02	3.96E-02	4.32E-02	4.21E-02	3.93E-02
	TPY	7.48E-03	6.64E-03	6.14E-03	6.61E-03	6.37E-03	5.94E-03	6.49E-03	6.31E-03	5.89E-03

Note: Based on firing natural gas and distillate oil for 8470 and 300 hours, respectively.
Total emissions include emissions from the combustion turbine and duct burner.

August 26, 1992

Mr. Clair H. Fancy, Chief
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Central Florida Power Limited Partnership
Tiger Bay (formerly Central Florida) cogeneration plant
PSD-FL-190
AC 53-214903

Dear Mr. Fancy:

This correspondence presents the information requested by the Department's July 14, 1992, letter. The responses have been prepared based on phone conversations held on July 15, 1992, with Mr. Mirza Baig, and subsequent discussions held with Mr. Cleve Holladay and Mr. John Glunn.

1. COMMENT: Section 1-1 states the electrical output of the cogeneration facility is 206 MW. The gas turbine (GT) is rated at 147 MW and the duct burner is rated at 74 MW, giving a total of 221 MW. What is the maximum electrical output you would like to be permitted for this facility?

   RESPONSE: The maximum electrical output of the cogeneration facility is 258 MW (GE machine) and 246 MW (Westinghouse machine), based on the following conditions: fuel oil firing and an ambient temperature of 27°F. The breakdown of the maximum electrical output for both machines for fuel oil is as follows:

Fuel/Unit	Maximum Rated Electrical Output (MW) GE	Westinghouse
Combustion Turbine	184	172
Steam Turbine	74	74

2. COMMENT: According to Section 1-1, two types of advanced GTs are being considered for this project. The Department must know the exact type of gas turbine you propose to install so that a BACT determination can be made. Accordingly, please submit detailed information of the unit selected. We will also need any available stack test data for that unit.

KBN ENGINEERING AND APPLIED SCIENCES, INC.
1034 Northwest 57th Street Gainesville, Florida 32605 904/331-9000 FAX: 904/332-4189

RESPONSE: The combustion turbine for the project has not been selected. The candidate turbines are currently being evaluated for performance and commercial terms. The air construction application for the project was based on the advanced class of turbines, and performance and emissions are similar for the two turbines under consideration. The information on both turbines is presented in Attachment 1. The information presented in the application was based on performance and emissions characteristics that enveloped these two turbines. Since the performance and emission characteristics are similar for the turbines under consideration, a decision regarding BACT would not be substantially different regardless of which turbine was selected. A similar decision was made by the Department in the BACT determination for the Hardee Power Station. In that project, four combustion turbines were proposed by the applicant, with the Department's BACT determination made on an envelope of performance and emission characteristics.

3. COMMENT: What is the maximum sulfur content of the natural gas you propose to burn? Provide a copy of any sulfur content guarantee that you may have from the supplier.

   RESPONSE: The maximum sulfur content of the natural gas proposed in the application was 1 grain of sulfur per 100 cubic feet (1 gr/100 cf). This was based on an evaluation of 9 months of sulfur content data supplied by Florida Gas Transmission (FGT). FGT is the only supplier of pipeline natural gas in Florida. The results of the evaluation are presented in Table 1. As shown in this table, the average sulfur content of natural gas was 0.43 gr/100 cf. A 130 percent contingency was used to develop the proposed emission rate of 1 gr/100 cf from the average sulfur content of 0.43 gr/100 cf reported by FGT in natural gas and would statistically account for potentially higher sulfur contents. Sulfur content information supplied by FGT for four sample analyses performed in April and May 1992 indicated a maximum sulfur content of 0.4 gr/100 cf which is within the previously supplied data (see Attachment 2).

   There is no guaranteed sulfur content for natural gas that is supplied by FGT.

4. COMMENT: Submit an updated process flow diagram showing steam turbine and volumetric air flow rates.

   RESPONSE: Updated process flow diagrams showing the steam turbine and the mass energy balance around the steam turbine and gas turbine are presented in Attachment 3 for natural gas and fuel oil firing.

5. COMMENT: In Section 4-12, Table 4-2, the emissions (25 ppmvd) for advance GT with dry low-NO_x technology appears to be incorrect. Also, Table 4-2 should state the turbine size on which these figures are based.

   RESPONSE: The 25 ppmvd listed for the dry low-NO_x technology in both the conventional and advanced machines is correct. This is the actual level that would be emitted from each machine. The 22.5 ppmvd listed on page 4-11 of the report is for the advanced machine when the emission rate is adjusted based on the same amount of generation (i.e., megawatt-hours) as a conventional gas turbine. As described in the preceding paragraph, the advanced

machine is more efficient and will result in lower NO_x emissions for each megawatt generated. This comparison would be analogous to the amount of particulate per ton of clinker produced by a cement plant.

The sizes of the turbines in Table 4-2 are: conventional--82 MW gas and 84 MW oil; advanced--147.1 MW gas and 159.2 MW oil [for GE PG7221(FA) machine at ambient temperature of 72 °F].

6. COMMENT: Submit all emission calculations and not just an example calculation. These emission calculations shall be based on the selected turbine for this project.

   RESPONSE: The detailed emission calculations for the turbine proposed for this project are presented in Attachment 4 to this letter.

7. COMMENT: What is the expected maximum ambient concentrations for the metals emitted?

   RESPONSE: The expected maximum ambient concentrations for toxic air pollutants, including metals, are presented in Table 7-5, page 7-9, in the PSD analysis that supports the air construction permit application. Based on the results presented in the table, the highest predicted impacts were below the no-threat levels for all pollutants and averaging times.

8. COMMENT: Please provide an air quality related analysis (AQRV) of the impact this project will have on the Chassahowitzka National Wilderness Area (CNWA) for the pollutant NO_2. The AQRV analysis includes impacts to soil, vegetation, and wildlife. This analysis also includes an assessment of impacts to the aquatic environment. Since the modeling information already provided with this application shows that the predicted NO_2 impact at the CNWA Class I area is less than the National Park Service (NPS) recommended significance level, the NPS has verbally stated that only a literature review is needed in order to comply with the AQRV analysis requirement.

   RESPONSE: KBN has performed air quality analyses to determine the Prevention of Significant Deterioration (PSD) Class I increment consumption and Air Quality Related Values (AQRV) Analyses for the Chassahowitzka National Wilderness Area (NWA) due to emissions from the Tiger Bay cogeneration facility. The facility is located approximately 120 km from the closest part of the Chassahowitzka National Wilderness Area (NWA), a PSD Class I area. The proposed facility alone had a maximum predicted annual average nitrogen dioxide (NO_2) impact of 0.014 $\mu g/m^3$, which is less than the National Park Service (NPS) significant impact level of 0.025 $\mu g/m^3$.

   Based on verbal communications between the Florida Department of Environmental Regulation (FDER) and NPS, the AQRV analyses for the PSD Class I area of the Chassahowitzka NWA need only address the impacts of increased NO_2 emissions for this project.

   The Chassahowitzka NWA is characterized by vegetation which includes flatwoods, brackish-water, marine, and halophytic terrestrial species. Predominant tree species are slash pine,

laurel oak, sweetgum, and palm. Other plants in the preserve include needlegrass rush, seashore saltgrass, marsh hay, and red mangrove. NO_2 concentrations can injure plant tissue with symptoms usually appearing as irregular white to brown collapsed lesions between the leaf veins and near the margins. Conversely, non-injurious levels of NO_2 can be absorbed by plants, enzymatically transformed into ammonia, and incorporated into plant constituents such as amino acids (Matsumaru et al., 1979).

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

By comparison of published toxicity values for NO_2 exposure to short-term (i.e., 1-, 3-, and 8-hour averaging times) and long-term (annual averaging time) modeled concentrations, the possibility of plant damage in the preserve can be examined for both acute and chronic exposure situations, respectively. The 1-, 3-, and 8-hour estimated NO_2 concentrations at the point of maximum impact are 3.65, 2.14, and 1.00 $\mu g/m^3$, respectively. These concentrations are approximately 6.7×10^{-5} to 9.6×10^{-4} of the levels that could potentially injure 5 percent of the plant foliage. For a chronic exposure, the annual estimated NO_2 concentration at the point of maximum impact in the preserve (0.014 $\mu g/m^3$) is 3.5×10^{-6} to 7.0×10^{-6} of the levels that caused minimal yield loss and chlorosis in plant tissue.

The majority of the soil in the Class I area is classified as Weekiwachee--Durbin muck. This is an euic, hyperthermic typic sufihemist that is characterized by high levels of sulfur and organic matter. This soil is flooded daily with the advent of high tide, and the pH ranges between 6.1 and 7.8. The upper level of this soil may contain as much as 4 percent sulfur (USDA, 1991).

The greatest threat to soils from increased NO_2 deposition is a decrease in pH or an increase of sulfur to levels considered unnatural or potentially toxic. Although ground deposition was not calculated, it is evident that the amount of NO_2 deposited would be inconsequential in light of the inherent sulfur content. The regular flooding of these soils by the Gulf of Mexico regulates the pH, and any rise in acidity in the soil would be buffered by this activity.

The predicted NO_2 concentrations are well below the lowest observed effects levels in animals (Newman and Schreiber, 1988). Given these conditions, the proposed source's emissions pose no risk to wildlife. Because predicted levels are below those known to cause effects to vegetation, there is also no risk.

References

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

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

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

U.S. Department of Agriculture. 1991. Surveys of Hernando and Citrus Counties, Florida. USDA Soil Conservation Service in cooperation with University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department.

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

9. COMMENT: Section 4.3.1.2, page 4-10, states that "While the increased firing temperature increases the thermal NO_x generated, this NO_x increase is controlled through combustion design." How much additional thermal NO_x is generated due to higher temperature?

   RESPONSE: The increased thermal NO_x emissions, due to the higher firing temperature of the advanced combustion turbine, is about 20 percent higher than a conventional turbine when firing natural gas (from Table 4-2, 150 ppmvd, conventional, compared to 179 ppmvd, advanced) and about 13 percent higher than a conventional turbine when firing oil (from Table 4-2, 245 ppmvd, conventional, compared to 276 ppmvd, advanced).

10. COMMENT: On page 4-3, the estimated cost of SCR is reported to be about $7,400 per ton of NO_x removed and it exceeds $10,000 per ton of pollutant removed when the net emissions of all pollutants (exclusive of CO_2) are considered. Provide us with the names and addresses of all manufacturers that were contacted while developing capital and annualized cost estimates for this project.

    RESPONSE: The cost for SCR was obtained from a database developed by KBN from this and other projects. The manufacturers contacted were:

    Steuler International Corporation
    P.O. Box 38
    Mertztown, PA 19539-0038
    215-682-7171

    Hitachi Zosen U.S.A. Ltd.
    150 East 52 nd Street
    New York, NY 10022
    212-355-5650

Mitsubishi International Corporation
2 Houston Center, Suite 3800
Houston, TX 77010
713-652-9200

W. R. Grace & Co.
P.O. Box 2117
Baltimore, MD 21203-2117
410-659-9000

Norton Company
P.O. Box 350
Arkon, OH 44309-0350
216-673-5860

11. COMMENT (via July 15, 1992, telephone conversation): Provide a large-scale site plan similar to Figure 2-2 of the air permit application.

    RESPONSE: A full-scale revised plot plan is included in Attachment 5.

12. COMMENT (via July 15, 1992, telephone conversation): Please provide a diagram indicating the proposed location of the sample ports for source sampling purposes. Show these locations with respect to the proposed stack and HRSG unit.

    RESPONSE: The stack sample port location is depicted in Figure 1. The sample port will be accessible by ladder from the top of the HRSG to a platform assembly near the port location.

Submittal of this information should clarify all questions raised by the Department in the completeness determination for this project. Please call me at 904-331-9000 if there are any further questions on the material submitted.

Sincerely,

Robert C. McCann Jr
for

Kennard F. Kosky, P.E.
President

Enclosures
KFK/dmm

cc: Mirza Baig, FDER
Robert I. Taylor, Central Florida Power, L.P.
Robert Chatham, Destec Engineering, Inc.
File (2)

Table 1. Sulfur Content, Heat Content, and SO_2 Emission Factors for Natural Gas

Date	Sulfur Content (gr/100 cf)	Heat Content (Btu)	SO_2 Emission Factor ($lb/10^6$ Btu)	SO_2 Emission Factor ($lb/10^6$ cf)
2/6/90	0.30	1,031	0.00083	0.857
2/13/90	0.05	1,028	0.00014	0.143
2/20/90	0.35	1,025	0.00098	1.000
2/27/90	0.45	1,024	0.00126	1.286
3/6/90	0.45	1,025	0.00125	1.286
3/13/90	0.30	1,026	0.00084	0.857
3/20/90	0.35	1,026	0.00097	1.000
3/27/90	0.35	1,025	0.00098	1.000
4/3/90	0.60	1,026	0.00167	1.714
4/10/90	0.25	1,022	0.00070	0.714
4/17/90	0.40	1,026	0.00111	1.143
4/24/90	0.30	1,022	0.00084	0.857
5/1/90	0.40	1,020	0.00112	1.143
5/8/90	0.25	1,034	0.00069	0.714
5/15/90	0.20	1,023	0.00056	0.571
6/5/90	0.45	1,020	0.00126	1.286
6/12/90	0.40	1,018	0.00112	1.143
6/19/90	0.70	1,017	0.00197	2.000
6/26/90	0.45	1,019	0.00126	1.286
7/3/90	0.55	1,022	0.00154	1.571
7/10/90	0.35	1,022	0.00098	1.000
7/17/90	0.45	1,021	0.00126	1.286
7/30/90	0.30	1,021	0.00084	0.857
8/7/90	0.50	1,024	0.00140	1.429
8/14/90	0.45	1,022	0.00126	1.286
8/21/90	0.40	1,022	0.00112	1.143
8/28/90	0.70	1,022	0.00196	2.000
9/4/90	0.55	1,029	0.00153	1.571
9/11/90	0.40	1,025	0.00111	1.143
9/18/90	0.45	1,026	0.00125	1.286
9/25/90	0.40	1,026	0.00111	1.143
10/2/90	0.45	1,029	0.00125	1.286
10/9/90	0.45	1,025	0.00125	1.286
10/16/90	0.70	1,028	0.00195	2.000
10/28/90	0.80	1,024	0.00223	2.286
Average:	0.43	1,024	0.00119	1.216
Maximum:	0.80	1,034	0.00223	2.286
Minimum:	0.05	1,017	0.00014	0.143
Std. Dev.	0.15	4	0.00042	0.427

Source: Florida Gas Transmission Company, 1990.

8-19-92
SHD DESTEC

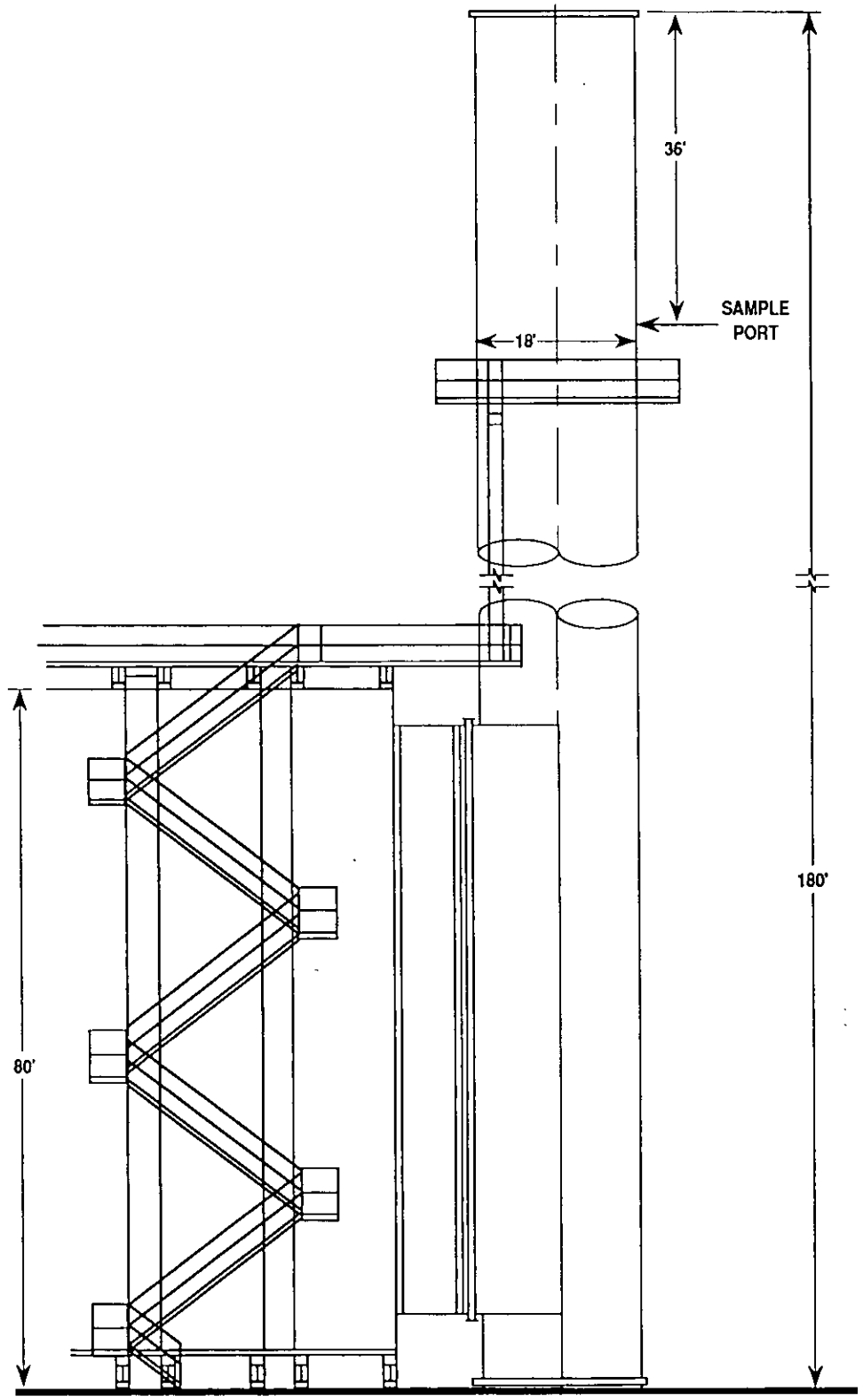


Figure 1 TIGER BAY CONCEPTUAL DRAWING OF STACK AND ADJOINING STRUCTURE

KBN

ATTACHMENT 1

MANUFACTURER'S DESIGN SPECIFICATIONS FOR THE COMBUSTION TURBINE

1.1 ESTIMATED PERFORMANCE – PG7221(FA)

LOAD CONDITION		BASE	90%	80%	70%	60%
AMBIENT TEMP.	– Deg F .	27	27	27	27	27
OUTPUT	– kW	170700.	153200.	135300.	119900.	101400.
HEAT RATE (LHV)	– Btu/kWh	9460.	9770.	10240.	10770.	11600.
HEAT CONS. (LHV) X10–6	– Btu/h	1614.8	1496.8	1385.5	1291.3	1176.2
EXHAUST FLOW X10–3	– lb/h	3582.0	3228.0	2958.0	2744.0	2521.0
EXHAUST TEMP	– Deg F.	1078.	1118.	1150.	1177.	1200.
EXHAUST ENERGY X10–6	– Btu/h	976.4	922.1	875.5	836.9	788.6
NOX	– ppmvd @ 15% O2	25.	25.	25.	25.	25.
NOX AS NO2	– lb/h	162	149.	138.	128.	116.
CO	– ppmvd	15.	*	*	*	*
CO	– lb/h	49.	*	*	*	*
UHC	– ppmvw	7.	*	*	*	*
UHC	– lb/h	14.	*	*	*	*
VOC	– ppmvw	1.4	*	*	*	*
VOC	– lb/h	2.8	*	*	*	*
PART	– lb/h	9.0	9.0	9.0	9.0	9.0
EXHAUST ANALYSIS % VOL.						
ARGON		0.90	0.90	0.90	0.90	0.90
NITROGEN		75.04	74.97	74.95	74.95	74.98
OXYGEN		12.71	12.52	12.46	12.46	12.56
CARBON DIOXIDE		3.74	3.83	3.85	3.85	3.81
WATER		7.61	7.78	7.84	7.84	7.75

SITE CONDITIONS		
ELEVATION	– ft.	160
SITE PRESSURE	– psia	14.62
INLET LOSS	– in. Water	4
EXHAUST LOSS	– in. Water	12
RELATIVE HUMIDITY	– %	40
FUEL TYPE	–	METHANE
FUEL LHV	– Btu/lb	21515
APPLICATION	–	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	–	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% O2 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
COMPRESSOR BLEED HEAT IS USED FOR 70% AND 60% PART LOAD OPERATION.
APPROXIMATELY 10% OF THE VOC'S ARE NON–METHANE AND ETHANE.
* DATA NOT AVAILABLE
IPS–8707
JPT 3/19/92

1.1 ESTIMATED PERFORMANCE – PG7221(FA)

LOAD CONDITION		BASE	90%	80%	70%	60%
AMBIENT TEMP.	– Deg F .	64	64	64	64	64
OUTPUT	– kW	151900.	136000.	124400.	106500.	89900.
HEAT RATE (LHV)	– Btu/kWh	9750.	10060.	10340.	11070.	11860.
HEAT CONS. (LHV) X10–6	– Btu/h	1481.0	1368.2	1286.3	1179.0	1066.2
EXHAUST FLOW X10–3	– lb/h	3322.0	3010.0	2810.0	2595.0	2413.0
EXHAUST TEMP	– Deg F.	1110.	1145.	1168.	1195.	1200.
EXHAUST ENERGY X10–6	– Btu/h	911.3	856.4	816.8	773.9	721.3
NOX	– ppmvd @ 15% O2	25.	25.	25.	25.	25.
NOX AS NO2	– lb/h	149	137.	129.	118.	107.
CO	– ppmvd	15.	*	*	*	*
CO	– lb/h	45.	*	*	*	*
UHC	– ppmvw	7.	*	*	*	*
UHC	– lb/h	13.	*	*	*	*
VOC	– ppmvw	1.4	*	*	*	*
VOC	– lb/h	2.6	*	*	*	*
PART	– lb/h	9.0	9.0	9.0	9.0	9.0
EXHAUST ANALYSIS % VOL.						
ARGON		0.89	0.89	0.88	0.88	0.89
NITROGEN		74.04	73.98	73.97	73.98	74.05
OXYGEN		12.56	12.41	12.35	12.41	12.62
CARBON DIOXIDE		3.68	3.75	3.78	3.75	3.65
WATER		8.83	8.97	9.02	8.98	8.79

SITE CONDITIONS		
ELEVATION	– ft.	160
SITE PRESSURE	– psia	14.62
INLET LOSS	– in. Water	4
EXHAUST LOSS	– in. Water	12
RELATIVE HUMIDITY	– %	78
FUEL TYPE	–	METHANE
FUEL LHV	– Btu/lb	21515
APPLICATION	–	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	–	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% O2 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
COMPRESSOR BLEED HEAT IS USED FOR 70% AND 60% PART LOAD OPERATION.
APPROXIMATELY 10% OF THE VOC'S ARE NON–METHANE AND ETHANE.
* DATA NOT AVAILABLE
IPS–8707
JPT 3/19/92

1.1 ESTIMATED PERFORMANCE – PG7221(FA)

LOAD CONDITION		BASE	90%	80%	70%	60%
AMBIENT TEMP.	– Deg F .	72	72	72	72	72
OUTPUT	– kW	147100.	131800.	120500.	103100.	86800.
HEAT RATE (LHV)	– Btu/kWh	9860.	10210.	10550.	11340.	12220.
HEAT CONS. (LHV) X10–6	– Btu/h	1450.4	1345.7	1271.3	1169.2	1060.7
EXHAUST FLOW X10–3	– lb/h	3262.0	2960.0	2768.0	2560.0	2383.0
EXHAUST TEMP	– Deg F.	1117.	1151.	1173.	1199.	1200.
EXHAUST ENERGY X10–6	– Btu/h	898.1	849.0	815.5	776.0	726.5
NOX	– ppmvd @ 15% O2	25.	25.	25.	25.	25.
NOX AS NO2	– lb/h	145	134.	126.	116.	105.
CO	– ppmvd	15.	*	*	*	*
CO	– lb/h	44.	*	*	*	*
UHC	– ppmvw	7.	*	*	*	*
UHC	– lb/h	13.	*	*	*	*
VOC	– ppmvw	1.4	*	*	*	*
VOC	– lb/h	2.6	*	*	*	*
PART	– lb/h	9.0	9.0	9.0	9.0	9.0
EXHAUST ANALYSIS % VOL.						
ARGON		0.89	0.88	0.89	0.87	0.88
NITROGEN		73.73	73.68	73.67	73.68	73.76
OXYGEN		12.51	12.37	12.32	12.39	12.63
CARBON DIOXIDE		3.66	3.73	3.75	3.72	3.61
WATER		9.21	9.34	9.38	9.34	9.12

SITE CONDITIONS		
ELEVATION	– ft.	160
SITE PRESSURE	– psia	14.62
INLET LOSS	– in. Water	4
EXHAUST LOSS	– in. Water	12
RELATIVE HUMIDITY	– %	75
FUEL TYPE	–	METHANE
FUEL LHV	– Btu/lb	21515
APPLICATION	–	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	–	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% O2 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
COMPRESSOR BLEED HEAT IS USED FOR 70% AND 60% PART LOAD OPERATION.
APPROXIMATELY 10% OF THE VOC'S ARE NON–METHANE AND ETHANE.
* DATA NOT AVAILABLE
IPS–8707
JPT 3/19/92

1.1 ESTIMATED PERFORMANCE – PG7221(FA)

LOAD CONDITION		BASE	90%	80%	70%	60%
AMBIENT TEMP.	– Deg F .	79	79	79	79	79
OUTPUT	– kW	142700.	127900.	116500.	99500.	83900.
HEAT RATE (LHV)	– Btu/kWh	9970.	10330.	10700.	11510.	12390.
HEAT CONS. (LHV) X10–6	– Btu/h	1422.7	1321.2	1246.6	1145.2	1039.5
EXHAUST FLOW X10–3	– lb/h	3202.0	2910.0	2725.0	2524.0	2352.0
EXHAUST TEMP	– Deg F.	1124.	1157.	1179.	1200.	1200.
EXHAUST ENERGY X10–6	– Btu/h	886.3	838.6	805.2	765.1	715.8
NOX	– ppmvd @ 15% O2	25.	25.	25.	25.	25.
NOX AS NO2	– lb/h	143	132.	124.	114.	103.
CO	– ppmvd	15.	*	*	*	*
CO	– lb/h	43.	*	*	*	*
UHC	– ppmvw	7.	*	*	*	*
UHC	– lb/h	13.	*	*	*	*
VOC	– ppmvw	1.4	*	*	*	*
VOC	– lb/h	2.6	*	*	*	*
PART	– lb/h	9.0	9.0	9.0	9.0	9.0
EXHAUST ANALYSIS % VOL.						
ARGON		0.87	0.88	0.87	0.88	0.87
NITROGEN		73.07	73.02	73.01	73.02	73.10
OXYGEN		12.36	12.22	12.19	12.28	12.52
CARBON DIOXIDE		3.65	3.71	3.73	3.68	3.58
WATER		10.05	10.17	10.20	10.14	9.93

SITE CONDITIONS		
ELEVATION	– ft.	160
SITE PRESSURE	– psia	14.62
INLET LOSS	– in. Water	4
EXHAUST LOSS	– in. Water	12
RELATIVE HUMIDITY	– %	86
FUEL TYPE	–	METHANE
FUEL LHV	– Btu/lb	21515
APPLICATION	–	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	–	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% O2 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
COMPRESSOR BLEED HEAT IS USED FOR 70 AND 60% PART LOAD OPERATION
APPROXIMATELY 10% OF THE VOC'S ARE NON–METHANE AND ETHANE.
* DATA NOT AVAILABLE
IPS–8707
JPT 3/19/92

1.1 ESTIMATED PERFORMANCE – PG7221(FA)

LOAD CONDITION		BASE	90%	80%	70%	60%
AMBIENT TEMP.	– Deg F	97	97	97	97	97
OUTPUT	– kW	131800.	118400.	106800.	90900.	77100.
HEAT RATE (LHV)	– Btu/kWh	10230.	10600.	11070.	11890.	12780.
HEAT CONS. (LHV) X10–6	– Btu/h	1348.3	1255.0	1182.3	1080.8	985.3
EXHAUST FLOW X10–3	– lb/h	3077.0	2808.0	2640.0	2454.0	2293.0
EXHAUST TEMP	– Deg F.	1140.	1170.	1190.	1200.	1200.
EXHAUST ENERGY X10–6	– Btu/h	851.5	807.0	776.1	732.0	686.5
NOX	– ppmvd @ 15% O2	25.	25.	25.	25.	25.
NOX AS NO2	– lb/h	135	125.	118.	107.	97.
CO	– ppmvd	15.	*	*	*	*
CO	– lb/h	41.	*	*	*	*
UHC	– ppmvw	7.	*	*	*	*
UHC	– lb/h	12.	*	*	*	*
VOC	– ppmvw	1.4	*	*	*	*
VOC	– lb/h	2.4	*	*	*	*
PART	– lb/h	9.0	9.0	9.0	9.0	9.0
EXHAUST ANALYSIS % VOL.						
ARGON		0.88	0.87	0.87	0.88	0.89
NITROGEN		73.13	73.09	73.10	73.13	73.20
OXYGEN		12.48	12.36	12.37	12.52	12.74
CARBON DIOXIDE		3.60	3.66	3.65	3.58	3.48
WATER		9.91	10.02	10.01	9.89	9.70

SITE CONDITIONS		
ELEVATION	– ft.	160
SITE PRESSURE	– psia	14.62
INLET LOSS	– in. Water	4
EXHAUST LOSS	– in. Water	12
RELATIVE HUMIDITY	– %	48
FUEL TYPE	–	METHANE
FUEL LHV	– Btu/lb	21515
APPLICATION	–	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	–	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% O2 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
COMPRESSOR BLEED HEAT IS USED FOR 70% AND 60% PART LOAD OPERATION.
APPROXIMATELY 10% OF THE VOC'S ARE NON-METHANE AND ETHANE.
* DATA NOT AVAILABLE
IPS–8707
JPT 3/19/92

DESTEC - GATOR COGEN

ESTIMATED PERFORMANCE - PG7221(FA)

LOAD CONDITION			BASE	70%
AMBIENT TEMP.		- Deg F.	27	27
OUTPUT		- kW	183700.	129200.
HEAT RATE (LHV)		- Btu/kWh	10070.	11430.
HEAT RATE (HHV)		- Btu/kWh	10674.	12115.
HEAT CONS. (LHV)	X10-6	- Btu/h	1849.9	1476.8
EXHAUST FLOW	X10-3	- lb/h	3743.0	2837.0
EXHAUST TEMP		- Deg F.	1060.	1166.
EXHAUST HEAT	X10-6	- Btu/h	1021.8	876.8
WATER FLOW		- lb/h	135390.	105120.
NOX		- ppmvd @ 15% 02	42.	42.
NOX AS NO2		- lb/h	327.	258.
CO		- ppmvd	30.	*
CO		- lb/h	98.	*
UHC		- ppmvw	7.	*
UHC		- lb/h	15.	*
VOC		- ppmvw	3.5	*
VOC		- lb/h	7.5	*
SO2		- ppmvw	11.	12.
SO2		- lb/h	95.	76.
SO3		- ppmvw	1.	1.
SO3		- lb/h	6.	5.
SULFUR MIST		- lb/h	10.	8.
PART		- lb/h	17.0	17.0

EXHAUST ANALYSIS % VOL.

ARGON	0.86	0.85
NITROGEN	71.27	71.08
OXYGEN	10.96	10.57
CARBON DIOXIDE	5.32	5.54
WATER	11.59	11.96

SITE CONDITIONS

ELEVATION	- ft.	160
SITE PRESSURE	- psia	14.62
INLET LOSS	- in. Water	4
EXHAUST LOSS	- in. Water	12
RELATIVE HUMIDITY	- %	40
FUEL TYPE	-	DISTILLATE
FUEL LHV	- Btu/lb	18550
APPLICATION	-	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	-	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% 02 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
DISTILLATE FUEL IS ASSUMED TO HAVE .015% FUEL BOUND NITROGEN, OR LESS.
FBN AMOUNTS GREATER THAN .015% WILL ADD TO THE REPORTED NOx VALUE.
SULFUR EMISSIONS BASED ON .05 WT% SULFUR CONTENT IN THE FUEL.
DATA NOT AVAILABLE
COMPRESSOR BLEED HEAT USED FOR PART LOAD OPERATION.

SULFUR EMISSIONS ARE BASED ON A TOTAL FUEL SULFUR CONTENT OF 0.05 WT%

1.1 ESTIMATED PERFORMANCE – PG7221(FA)

LOAD CONDITION			BASE	70%
AMBIENT TEMP.		– Deg F.	72	72
OUTPUT		– kW	159200.	111000.
HEAT RATE (LHV)		– Btu/kWh	10320.	11800.
HEAT CONS. (LHV)	X10–6	– Btu/h	1642.9	1309.8
EXHAUST FLOW	X10–3	– lb/h	3390.0	2619.0
EXHAUST TEMP		– Deg F.	1102.	1192.
EXHAUST HEAT	X10–6	– Btu/h	932.2	801.6
WATER FLOW		– lb/h	107070.	80490.
NOX		– ppmvd @ 15% O2	42.	42.
NOX AS NO2		– lb/h	290.	229.
CO		– ppmvd	30.	*
CO		– lb/h	89.	*
UHC		– ppmvw	7.	*
UHC		– lb/h	13.	*
VOC		– ppmvw	3.5	*
VOC		– lb/h	6.5	*
PART		– lb/h	17.0	17.0
EXHAUST ANALYSIS % VOL.				
ARGON			0.86	0.86
NITROGEN			70.59	70.63
OXYGEN			10.95	10.81
CARBON DIOXIDE			5.21	5.31
WATER			12.40	12.40

SITE CONDITIONS		
ELEVATION	– ft.	160
SITE PRESSURE	– psia	14.62
INLET LOSS	– in. Water	4
EXHAUST LOSS	– in. Water	12
RELATIVE HUMIDITY	– %	75
FUEL TYPE	–	DISTILLATE
FUEL LHV	– Btu/lb	18550
APPLICATION	–	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	–	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% O2 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
DISTILLATE FUEL IS ASSUMED TO HAVE 0.015% FUEL BOUND NITROGEN, OR LESS. FUEL BOUND NITROGEN AMOUNTS GREATER THAN 0.015% WILL ADD TO THE REPORTED NOx VALUE.
* DATA NOT AVAILABLE
COMPRESSOR BLEED HEAT IS USED FOR PART LOAD OPERATION.
IPS–8707
JPT 4/14/92

1.1 ESTIMATED PERFORMANCE – PG7221(FA)

LOAD CONDITION			BASE	70%
AMBIENT TEMP.		– Deg F.	97	97
OUTPUT		– kW	142500.	98500.
HEAT RATE (LHV)		– Btu/kWh	10650.	12280.
HEAT CONS. (LHV)	X10–6	– Btu/h	1517.6	1209.6
EXHAUST FLOW	X10–3	– lb/h	3189.0	2510.0
EXHAUST TEMP		– Deg F.	1127.	1200.
EXHAUST HEAT	X10–6	– Btu/h	881.7	758.7
WATER FLOW		– lb/h	92890.	68760.
NOX		– ppmvd @ 15% O2	42.	42.
NOX AS NO2		– lb/h	268.	211.
CO		– ppmvd	30.	*
CO		– lb/h	83.	*
UHC		– ppmvw	7.	*
UHC		– lb/h	13.	*
VOC		– ppmvw	3.5	*
VOC		– lb/h	6.5	*
PART		– lb/h	17.0	17.0
EXHAUST ANALYSIS % VOL.				
ARGON			0.85	0.85
NITROGEN			70.31	70.49
OXYGEN			11.03	11.07
CARBON DIOXIDE			5.11	5.11
WATER			12.71	12.48

SITE CONDITIONS		
ELEVATION	– ft.	160
SITE PRESSURE	– psia	14.62
INLET LOSS	– in. Water	4
EXHAUST LOSS	– in. Water	12
RELATIVE HUMIDITY	– %	48
FUEL TYPE	–	DISTILLATE
FUEL LHV	– Btu/lb	18550
APPLICATION	–	317S HYDROGEN COOLED GENERATOR
COMBUSTION SYSTEM	–	DRY LOW NOX II

EMISSION INFORMATION BASED ON GE RECOMMENDED MEASUREMENT METHODS.
NOx EMISSIONS ARE CORRECTED TO 15% O2 WITHOUT HEAT RATE CORRECTION AND ARE NOT CORRECTED TO ISO REFERENCE CONDITIONS PER 40CFR 60.335(a)(1)(i).
NOx LEVELS SHOWN WILL BE CONTROLLED BY ALGORITHMS WITHIN THE SPEEDTRONIC CONTROL SYSTEM.
DISTILLATE FUEL IS ASSUMED TO HAVE 0.015% FUEL BOUND NITROGEN, OR LESS.
FUEL BOUND NITROGEN AMOUNTS GREATER THAN 0.015% WILL ADD TO THE REPORTED NOx VALUE.
* DATA NOT AVAILABLE
COMPRESSOR BLEED HEAT IS USED FOR PART LOAD OPERATION.
IPS–8707
JPT 4/14/92

DESTEC ENGINEERING - TIGER BAY PROJECT

DRY LOW NOx COMBUSTOR
EXPECTED 501F COMBUSTION TURBINE PERFORMANCE AND EMISSIONS

Rev. 2
8/19/92

SITE CONDITIONS:

FUEL TYPE	GAS	GAS	GAS	GAS	GAS
LOAD LEVEL	BASE	BASE	BASE	BASE	BASE
FUEL HEATING VALUE, BTU/LB LHV	20900	20900	20900	20900	20900
FUEL HEATING VALUE, BTU/LB HHV	23200	23200	23200	23200	23200
AMBIENT TEMPERATURE, F	27	64	72	79	97
RELATIVE HUMIDITY	40	78	75	75	48
BAROMETRIC PRESSURE, PSIA	14.615	14.615	14.615	14.615	14.615
INLET PRESSURE LOSS, IN-WATER	4.0	3.7	3.6	3.5	3.4
EXHAUST PRESSURE LOSS, IN-WATER	11.0	9.6	9.3	9.0	8.4
INJECTION FLUID	NONE	NONE	NONE	NONE	NONE
INJECTION RATIO, LB/LB	0	0	0	0	0
GENERATOR POWER FACTOR	0.85	0.85	0.85	0.85	0.85
GENERATOR HYDROGEN PRESSURE, PSIA	30	30	30	30	30
GENERATOR FRAME (97 X 114)					

COMBUSTION TURBINE PERFORMANCE:

NET POWER OUTPUT, KW	169210	147950	143450	139560	129370
HEAT RATE, BTU/KWH LHV	9490	9900	10000	10100	10360
HEAT RATE, BTU/KWH HHV	10530	10990	11100	11210	11500
EXHAUST FLOW, LB/HR	3702540	3431310	3369010	3311770	3180510
EXHAUST TEMPERATURE, F	1053	1086	1092	1098	1111
FUEL FLOW, LB/HR	76830	70080	68640	67440	64130
INJECTION RATE, LB/HR	0	0	0	0	0
AUXILIARY LOAD, KW	400	400	400	400	400
HEAT INPUT, MMBTU/HR (LHV)	1606	1465	1435	1409	1340
HEAT INPUT, MMBTU/HR (HHV)	1782	1626	1592	1565	1486
EXHAUST ENERGY, MMBTU/HR	1053.5	1004.6	994.1	985.4	959.0

EXHAUST GAS COMPOSITION (BY PCT VOL):

OXYGEN	13.06	12.97	12.91	12.82	12.64
CARBON DIOXIDE	3.61	3.53	3.52	3.51	3.47
WATER	7.26	8.45	8.82	9.32	9.56
NITROGEN	75.09	74.11	73.81	73.41	73.20
ARGON	0.94	0.93	0.93	0.92	0.92
MOLECULAR WEIGHT	28.50	28.36	28.32	28.26	28.23

EMISSIONS

NOx, PPMVD @ 15% O2	25	25	25	25	25
NOx, LB/HR	163	148	145	143	135
CO, PPMVD	10	10	10	10	10
CO, LB/HR	35	32	31	31	29
SO2, PPMVD	1	1	1	1	1
SO2, LB/HR	2	1	1	1	1
TOTAL UHC, PPMVD	8	8	8	8	8
TOTAL UHC, LB/HR	16	15	14	14	13
VOC, PPMVD	4	4	4	4	4
VOC, LB/HR	8	7	7	7	7
PARTICULATES (PM10/TSP), LB/HR (TOTAL)	6.6	6.1	6.0	5.9	5.7
SOOT, LB/HR	6.3	5.9	5.8	5.7	5.5
ASH, LB/HR	0.0	0.0	0.0	0.0	0.0
H2SO4 MIST, LB/HR	0.2	0.2	0.2	0.2	0.2
CO2, PPMVD	40055	39729	39758	39894	39524
CO2, LB/HR	212418	193677	189813	186588	177226
OPACITY, %	<=10	<=10	<=10	<=10	<=10

NOTES:

1. The net power output is the power at the generator terminals minus turbine auxillary loads.
2. The fuel composition for natural gas is per customer's specification.
3. Exhaust energy is referenced to 400 degrees Rankine.

DESTEC ENGINEERING – TIGER BAY PROJECT
DRY LOW NOx COMBUSTOR
EXPECTED 501F COMBUSTION TURBINE PERFORMANCE AND EMISSIONS

GTT-5250
Rev. 2
8/19/92

SITE CONDITIONS:

FUEL TYPE	GAS	GAS	GAS	GAS	GAS
LOAD LEVEL	70%	70%	70%	70%	70%
FUEL HEATING VALUE, BTU/LB LHV	20900	20900	20900	20900	20900
FUEL HEATING VALUE, BTU/LB HHV	23200	23200	23200	23200	23200
AMBIENT TEMPERATURE, F	27	64	72	79	97
RELATIVE HUMIDITY	40	76	75	75	48
BAROMETRIC PRESSURE, PSIA	14.615	14.615	14.615	14.615	14.615
INLET PRESSURE LOSS, IN-WATER	2.3	2.3	2.3	2.3	2.2
EXHAUST PRESSURE LOSS, IN-WATER	6.7	6.1	5.9	5.8	5.5
INJECTION FLUID	NONE	NONE	NONE	NONE	NONE
INJECTION RATIO, LB/LB	0	0	0	0	0
GENERATOR POWER FACTOR	0.85	0.85	0.85	0.85	0.85
GENERATOR HYDROGEN PRESSURE, PSIA	30	30	30	30	30
GENERATOR FRAME (97 X 114)					

COMBUSTION TURBINE PERFORMANCE:

NET POWER OUTPUT, KW	118330	103390	100210	97490	90340
HEAT RATE, BTU/KWH LHV	10490	11020	11150	11270	11600
HEAT RATE, BTU/KWH HHV	11650	12230	12370	12510	12880
EXHAUST FLOW, LB/HR	2754000	2678720	2647790	2619850	2554960
EXHAUST TEMPERATURE, F	1130	1130	1130	1130	1130
FUEL FLOW, LB/HR	59390	54520	53460	52570	50140
INJECTION RATE, LB/HR	0	0	0	0	0
AUXILIARY LOAD, KW	400	400	400	400	400
HEAT INPUT, MMBTU/HR (LHV)	1241	1139	1117	1099	1048
HEAT INPUT, MMBTU/HR (HHV)	1378	1265	1240	1220	1163
EXHAUST ENERGY, MMBTU/HR	834.4	816.3	808.4	801.9	782.8

EXHAUST GAS COMPOSITION (BY PCT VOL):

OXYGEN	13.04	13.10	13.09	13.04	13.15
CARBON DIOXIDE	3.62	3.47	3.44	3.41	3.33
WATER	7.30	8.32	8.56	9.12	9.29
NITROGEN	75.08	74.16	73.87	73.50	73.30
ARGON	0.94	0.93	0.93	0.92	0.92
MOLECULAR WEIGHT	28.49	28.37	28.33	28.28	28.25

EMISSIONS

NOx, PPMVD @ 15% O2	25	25	25	25	25
NOx, LB/HR	121	113	111	109	104
CO, PPMVD	10	10	10	10	10
CO, LB/HR	26	25	25	24	24
SO2, PPMVD	1	1	1	1	1
SO2, LB/HR	1	1	1	1	1
TOTAL UHC, PPMVD	8	8	8	8	8
TOTAL UHC, LB/HR	12	11	11	11	11
VOC, PPMVD	4	4	4	4	4
VOC, LB/HR	6	6	6	6	5
PARTICULATES (PM10/TSP), LB/HR (TOTAL)	4.9	4.8	4.7	4.7	4.6
SOOT, LB/HR	4.7	4.6	4.6	4.5	4.4
ASH, LB/HR	0.0	0.0	0.0	0.0	0.0
H2SO4 MIST, LB/HR	0.2	0.2	0.2	0.2	0.2
CO2, PPMVD	40247	39014	38766	38626	37815
CO2, LB/HR	158710	148643	145662	143148	136547
OPACITY, %	<=10	<=10	<=10	<=10	<=10

NOTES:

1. The net power output is the power at the generator terminals minus turbine auxiliary loads.
2. The fuel composition for natural gas is per customer's specication.
3. Exhaust energy is referenced to 400 degrees Rankine.
4. Part loads are achieved by modulating igvs.

DESTEC ENGINEERING - TIGER BAY PROJECT CTT-523D
DRY LOW NOx COMBUSTOR Rev. 2
EXPECTED 501F COMBUSTION TURBINE PERFORMANCE AND EMISSIONS 8/19/92

SITE CONDITIONS:

FUEL TYPE	OIL	OIL	OIL
LOAD LEVEL	PART	BASE	BASE
FUEL HEATING VALUE, BTU/LB LHV	18450	18450	18450
FUEL HEATING VALUE, BTU/LB HHV	19680	19680	19680
AMBIENT TEMPERATURE, F	27	72	97
RELATIVE HUMIDITY	40	75	45
BAROMETRIC PRESSURE, PSIA	14.615	14.615	14.615
INLET PRESSURE LOSS, IN-WATER	3.5	3.8	3.6
EXHAUST PRESSURE LOSS, IN-WATER	10.3	10.0	9.0
INJECTION FLUID	STEAM	STEAM	STEAM
INJECTION RATIO, LB/LB	1.5	1.5	1.5
GENERATOR POWER FACTOR	0.85	0.85	0.85
GENERATOR HYDROGEN PRESSURE, PSIA	30	30	30
GENERATOR FRAME (97 X 114)			

COMBUSTION TURBINE PERFORMANCE:

NET POWER OUTPUT, KW	171970	162330	147180
HEAT RATE, BTU/KWH LHV	9280	9560	9850
HEAT RATE, BTU/KWH HHV	9900	10190	10510
EXHAUST FLOW, LB/HR	3502180	3509380	3311800
EXHAUST TEMPERATURE, F	1104	1104	1121
FUEL FLOW, LB/HR	86500	84110	78580
INJECTION RATE, LB/HR	129750	126170	117870
AUXILIARY LOAD, KW	600	600	600
HEAT INPUT, MMBTU/HR (LHV)	1596	1552	1450
HEAT INPUT, MMBTU/HR (HHV)	1702	1655	1548
EXHAUST ENERGY, MMBTU/HR	1054.5	1064.2	1024.3

EXHAUST GAS COMPOSITION (BY PCT VOL):

OXYGEN	11.92	11.88	11.83
CARBON DIOXIDE	5.00	4.83	4.76
WATER	10.60	11.91	12.57
NITROGEN	71.56	70.47	69.94
ARGON	0.90	0.89	0.88
MOLECULAR WEIGHT	28.33	28.17	28.09

EMISSIONS

NOx, PPMVD @ 15% O2	42	42	42
NOx, LB/HR	279	271	253
CO, PPMVD	50	50	50
CO, LB/HR	159	158	149
SO2, PPMVD	13	12	12
SO2, LB/HR	89	87	81
TOTAL UHC, PPMVD	20	20	20
TOTAL UHC, LB/HR	36	36	34
VOC, PPMVD	10	10	10
VOC, LB/HR	18	18	17
PARTICULATES (PM10/TSP), LB/HR (TOTAL)	39.6	39.0	36.7
SOOT, LB/HR	16.6	16.7	15.8
ASH, LB/HR	8.9	8.7	8.1
H2SO4 MIST, LB/HR	14.1	13.7	12.8
CO2, PPMVD	57653	56431	56099
CO2, LB/HR	280388	272545	254472
OPACITY, %	<=20	<=20	<=20

NOTES:

1. The net power output is the power at the generator terminals minus turbine auxiliary loads.
2. The fuel composition for distillate oil is per customer's specification.
3. Exhaust energy is referenced to 400 degrees Rankine.
4. Part loads are achived by modulating igvs.
5. Power output at 27 deg. F is limited to 172 MW.

DESTEC ENGINEERING – TIGER BAY PROJECT
DRY LOW NOx COMBUSTOR
EXPECTED 501F COMBUSTION TURBINE PERFORMANCE AND EMISSIONS

CTI-5230
Rev. 2
8/19/92

SITE CONDITIONS:

FUEL TYPE	OIL	OIL	OIL
LOAD LEVEL	70%	70%	70%
FUEL HEATING VALUE, BTU/LB LHV	18450	18450	18450
FUEL HEATING VALUE, BTU/LB HHV	19680	19680	19680
AMBIENT TEMPERATURE, F	27	72	97
RELATIVE HUMIDITY	40	75	48
BAROMETRIC PRESSURE, PSIA	14.615	14.615	14.615
INLET PRESSURE LOSS, IN-WATER	2.3	2.3	2.2
EXHAUST PRESSURE LOSS, IN-WATER	7.2	8.4	5.9
INJECTION FLUID	STEAM	STEAM	STEAM
INJECTION RATIO, LB/LB	1.5	1.5	1.5
GENERATOR POWER FACTOR	0.85	0.85	0.85
GENERATOR HYDROGEN PRESSURE, PSIA	30	30	30
GENERATOR FRAME (97 X 114)			

COMBUSTION TURBINE PERFORMANCE:

NET POWER OUTPUT, KW	133020	113400	102810
HEAT RATE, BTU/KWH LHV	9770	10310	10680
HEAT RATE, BTU/KWH HHV	10420	10990	11390
EXHAUST FLOW, LB/HR	2934960	2757580	2662180
EXHAUST TEMPERATURE, F	1130	1130	1130
FUEL FLOW, LB/HR	70440	63370	59510
INJECTION RATE, LB/HR	105660	95060	89270
AUXILIARY LOAD, KW	600	600	600
HEAT INPUT, MMBTU/HR (LHV)	1300	1169	1098
HEAT INPUT, MMBTU/HR (HHV)	1386	1247	1171
EXHAUST ENERGY, MMBTU/HR	904.4	855.3	828.0

EXHAUST GAS COMPOSITION (BY PCT VOL):

OXYGEN	12.08	12.17	12.26
CARBON DIOXIDE	4.91	4.67	4.53
WATER	10.43	11.58	12.09
NITROGEN	71.66	70.68	70.23
ARGON	0.90	0.88	0.88
MOLECULAR WEIGHT	28.34	28.19	28.12

EMISSIONS

NOx, PPMVD @ 15% O2	42	42	42
NOx, LB/HR	229	205	193
CO, PPMVD	50	50	50
CO, LB/HR	134	125	120
SO2, PPMVD	12	12	12
SO2, LB/HR	73	65	61
TOTAL UHC, PPMVD	20	20	20
TOTAL UHC, LB/HR	31	29	27
VOC, PPMVD	10	10	10
VOC, LB/HR	15	14	14
PARTICULATES (PM10/TSP), LB/HR (TOTAL)	32.6	30.0	28.5
SOOT, LB/HR	13.9	13.1	12.7
ASH, LB/HR	7.3	6.5	6.1
H2SO4 MIST, LB/HR	11.4	10.3	9.7
CO2, PPMVD	56460	54374	53041
CO2, LB/HR	230464	206946	194263
OPACITY, %	<=20	<=20	<=20

NOTES:

1. The net power output is the power at the generator terminals minus turbine auxiliary loads.
2. The fuel composition for distillate oil is per customer's specification.
3. Exhaust energy is referenced to 400 degrees Rankine.
4. Part loads are achieved by modulating igvs.

ATTACHMENT 2

FLORIDA GAS TRANSMISSION
NATURAL GAS SAMPLE ANALYSES

ANALYSIS

DATE: 04/28/92 ANALYSIS TIME: 345 STREAM SEQUENCE: 12
TIME: 11:22 CYCLE TIME: 360 STREAM#: 2
ANALYZER#: 1 MODE: RUN CYCLE START TIME: 11:16

COMP NAME	COMP CODE	MOLE %	GAL/MCF**	B.T.U.*	SP. GR.
HEXANE +	151	0.022	0.0096	1.13	0.000
PROPANE	152	0.162	0.0446	4.08	0.002
I-BUTANE	153	7892.15-6	0.0026	0.26	0.000
N-BUTANE	154	7528.58-6	0.0024	0.25	0.000
IPENTANE	155	4220.48-6	0.0015	0.17	0.000
NPENTANE	156	4062.01-6	0.0015	0.16	0.000
NITROGEN	157	0.418	0.0000	0.00	0.004
METHANE	158	96.588	0.0000	977.78	0.5549 0.535
CO2	159	0.804	0.0000	0.00	0.012
ETHANE	160	1.982	0.5302	35.15	0.020
TOTALS		100.000	0.5923	1018.97	0.575

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

** @ 14.730 & 60 DEG. F

COMPRESSIBILITY FACTOR (1/Z) = 1.0021
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1021.1
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1003.3
REAL SPECIFIC GRAVITY = 0.5764
UNNORMALIZED TOTAL = 99.86

ACTIVE ALARMS

NONE

Comm
1041.8 / 0.5939
1041.9 :: 0.5939

→ TOTAL SULFUR = 0.35 Gr/100 H_2S 0.05 Gr/ccF
0.8

ANALYSIS

DATE: 05/05/92 ANALYSIS TIME: 345 STREAM SEQUENCE: 12
TIME: 11:25 CYCLE TIME: 360 STREAM#: 2
ANALYZER#: 1 MODE: RUN CYCLE START TIME: 11:19

COMP NAME	COMP CODE	MOLE %	GAL/MCF**	B.T.U.*	SP. GR
HEXANE +	151	0.024	0.0106	1.25	0.00
PROPANE	152	0.172	0.0474	4.34	0.00
I-BUTANE	153	9949.88-6	0.0033	0.32	0.00
N-BUTANE	154	7610.23-6	0.0024	0.25	0.00
IPENTANE	155	3393.25-6	0.0012	0.14	0.00
NPENTANE	156	2694.51-6	0.0010	0.11	0.00
NITROGEN	157	0.348	0.0000	0.00	0.00
METHANE	158	96.786	0.0000	979.77	0.53
CO2	159	0.726	0.0000	0.00	0.01
ETHANE	160	1.919	0.5134	34.04	0.01
TOTALS		100.000	0.5793	1020.22	0.57

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

** @ 14.730 & 60 DEG. F

COMPRESSIBILITY FACTOR (1/Z) = 1.0021
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1022.4
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1004.6
REAL SPECIFIC GRAVITY = 0.5752
UNNORMALIZED TOTAL = 99.80

ACTIVE ALARMS

NONE

FLORIDA GAS TRANSMISSION CO.
comm
1041.8 / 0.5939
1041.9 0.5939
→ TOTAL SULPHUR 0.30 GR/100 H_2S 0.05 GR/CCF
1.0 Bill Lanson

ANALYSIS

DATE: 05/12/92 ANALYSIS TIME: 345 STREAM SEQUENCE: 12
TIME: 12:17 CYCLE TIME: 360 STREAM#: 2
ANALYZER#: 1 MODE: RUN CYCLE START TIME: 12:11

COMP NAME	COMP CODE	MOLE %	GAL/MCF**	B.T.U.*	SP. GR.*
HEXANE +	151	0.021	0.0090	1.06	0.0007
PROPANE	152	0.177	0.0487	4.46	0.0027
I-BUTANE	153	0.014	0.0045	0.45	0.0003
N-BUTANE	154	0.012	0.0039	0.41	0.0003
IPENTANE	155	5825.91-6	0.0021	0.23	0.0001
NPENTANE	156	3664.47-6	0.0013	0.15	0.0001
NITROGEN	157	0.398	0.0000	0.00	0.0038
METHANE	158	96.669	0.0000	978.59	0.5355
CO2	159	0.748	0.0000	0.00	0.0114
ETHANE	160	1.952	0.5221	34.62	0.0203
TOTALS		100.000	0.5916	1019.95	0.5750

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

** @ 14.730 & 60 DEG. F

COMPRESSIBILITY FACTOR (1/Z) = 1.0021
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1022.1
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1004.3
REAL SPECIFIC GRAVITY = 0.5760
UNNORMALIZED TOTAL = 99.62

ACTIVE ALARMS

NONE

Comm.
1041.8 / 0.5939
1041.9 0.5938
→ ~~Fore Scrubber~~ 0.35 G#/CCF: H2S 205 G#/CCF
1.1 Bill Stinson

ANALYSIS

DATE: 05/19/92
TIME: 13:02
ANALYZER#: [illegible] 1/

ANALYSIS TIME: 345
CYCLE TIME: 360
MODE: RUN

STREAM SEQUENCE: 12
STREAM#: [illegible] 2
CYCLE START TIME: 12:56

COMP NAME	COMP CODE	MOLE %	GAL/MCF**	B.T.U.*	SP. GR.*
HEXANE +	151	0.024	0.0105	1.24	0.0008
PROPANE	152	0.189	0.0521	4.77	0.0029
I-BUTANE	153	0.015	0.0048	0.47	0.0003
N-BUTANE	154	0.012	0.0038	0.39	0.0002
IPENTANE	155	4932.21-6	0.0018	0.20	0.0001
NPENTANE	156	3461.10-6	0.0013	0.14	0.0001
NITROGEN	157	0.405	0.0000	0.00	0.0039
METHANE	158	96.505	0.0000	976.92	0.5345
CO2	159	0.725	0.0000	0.00	0.0110
ETHANE	160	2.117	0.5662	37.54	0.0220
TOTALS		100.000	0.6404	1021.68	0.5758

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

** @ 14.730 & 60 DEG. F

COMPRESSIBILITY FACTOR (1/Z) = 1.0021
DRY B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1023.8
SAT B.T.U. @ 14.730 PSIA & 60 DEG. F CORRECTED FOR (1/Z) = 1006.0
REAL SPECIFIC GRAVITY = 0.5768
UNNORMALIZED TOTAL = 99.83

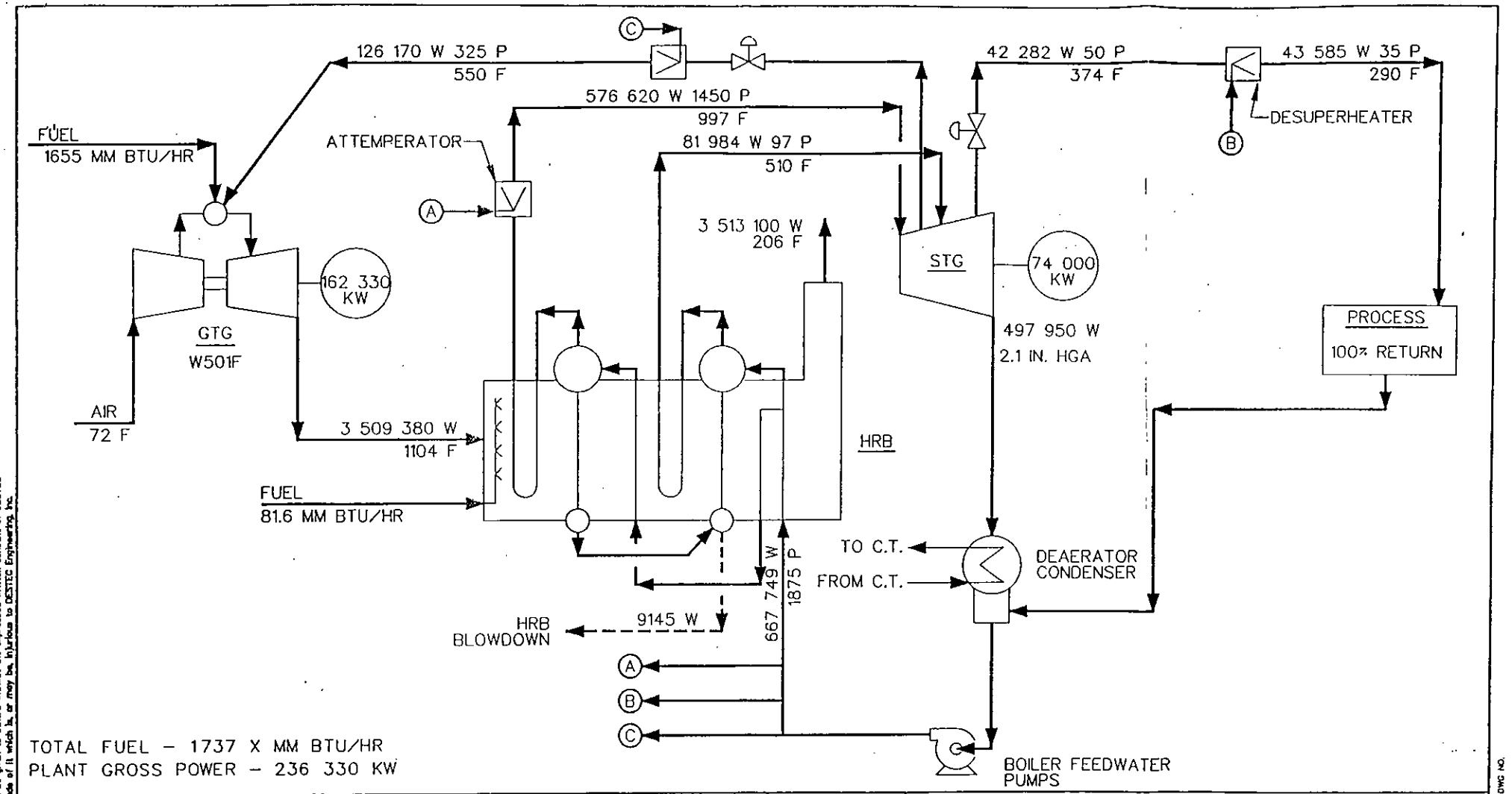
ACTIVE ALARMS

NONE

FLORIDA GAS TRANSMISSION CO.
BROOKER LAB- Comm.
STANDARD GAS 1041.8 / 0.5939
CERTIFIED VALUE BTU 1041.9 GRAV. 0.5939
TOTAL SULFUR 0.30 GR/CCF H^2S 0.05 GR/CCF
H^2O 1.1 #/MMCF BY [signature]

ATTACHMENT 3

PROCESS FLOW DIAGRAMS FOR THE COMBUSTION TURBINE FIRING NATURAL GAS AND OIL



LEGEND

P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

SCALE : NONE

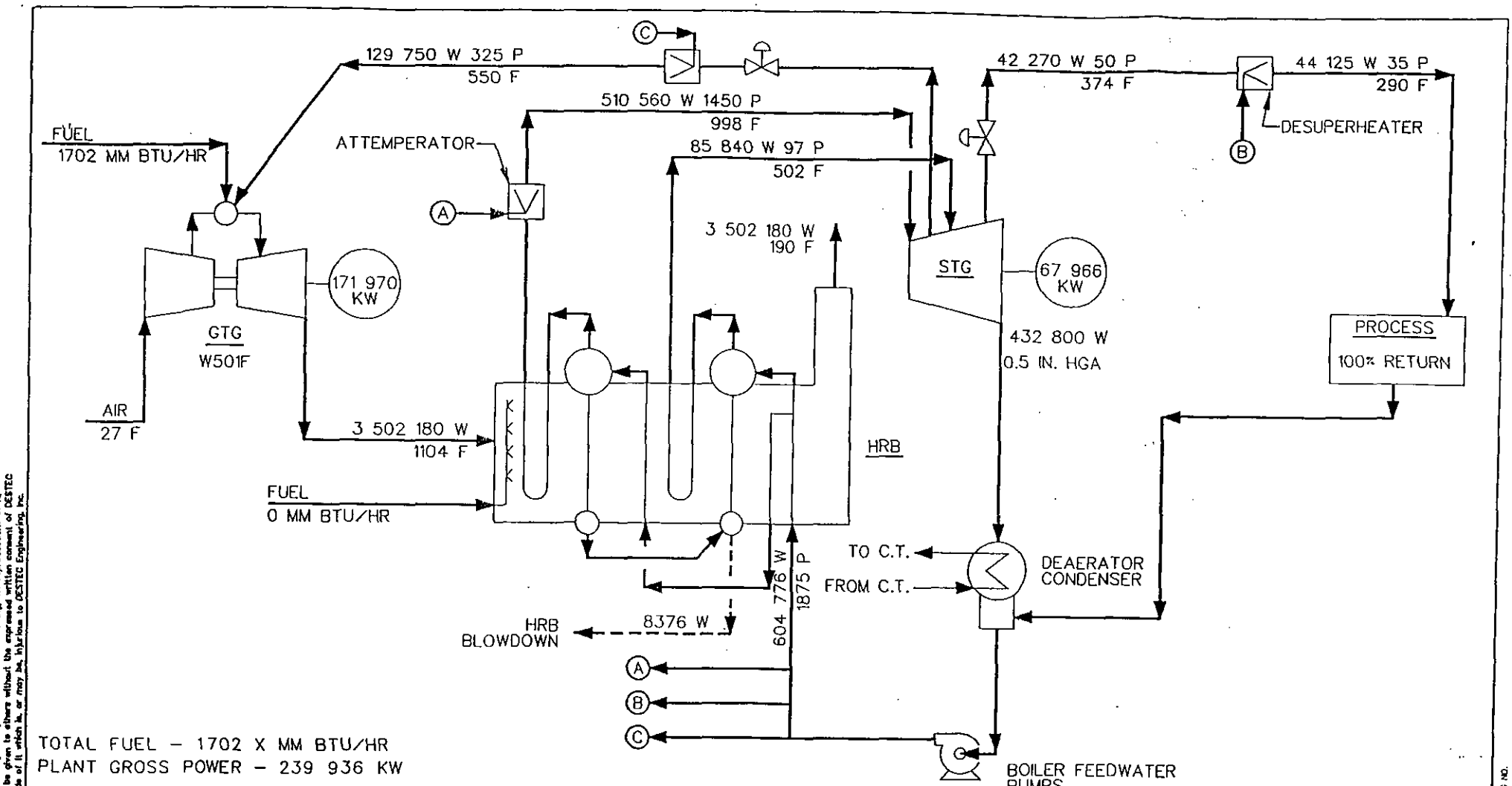
CALC. TCE	DATE 8-25-92
DWN. RDP	DATE 8-25-92
CHK.	DATE
APPV.	DATE

DESTEC ENGINEERING

W501F
FLOW DIAGRAM
CASE: AVG AMB OIL FIRED

PROJECT NO: 1253
CLIENT: TIGER BAY COGEN
DWG. NO: 1253-M-017.01
REV. 0

DWG NO.
RDP
062592



LEGEND

P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

SCALE : NONE

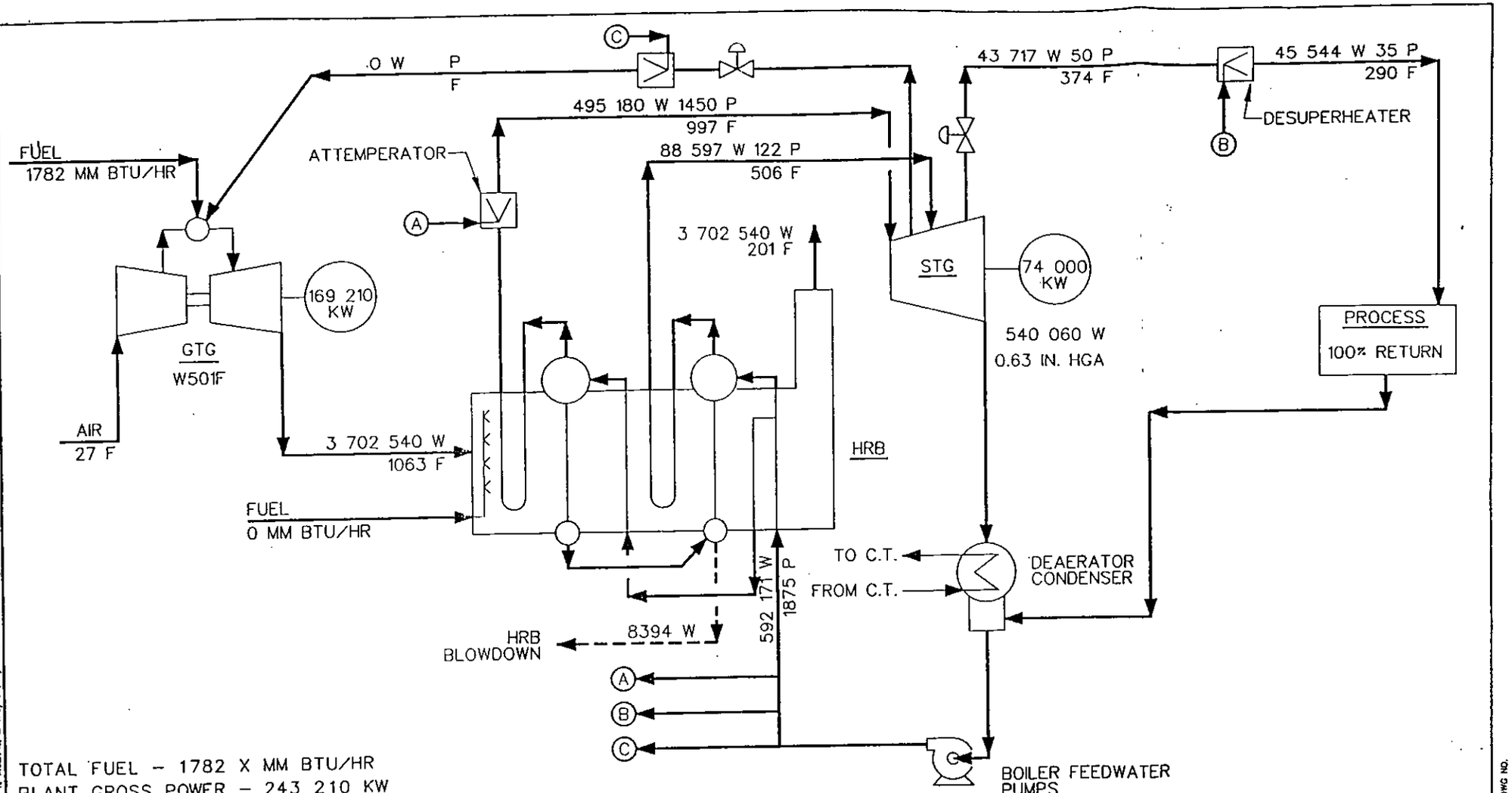
CALC. TCE	DATE 8-25-92
DWN. RDP	DATE 8-25-92
CHK.	DATE
APPV.	DATE

DESTEC ENGINEERING

W501F
FLOW DIAGRAM
CASE: WINTER DES OIL UNFIRED

PROJECT NO.: 1253
CLIENT: TIGER BAY COGEN
DWG. NO.: 1253-M-017.02
REV.: 0

DWG NO.
RDP
052592



LEGEND
P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

SCALE : NONE

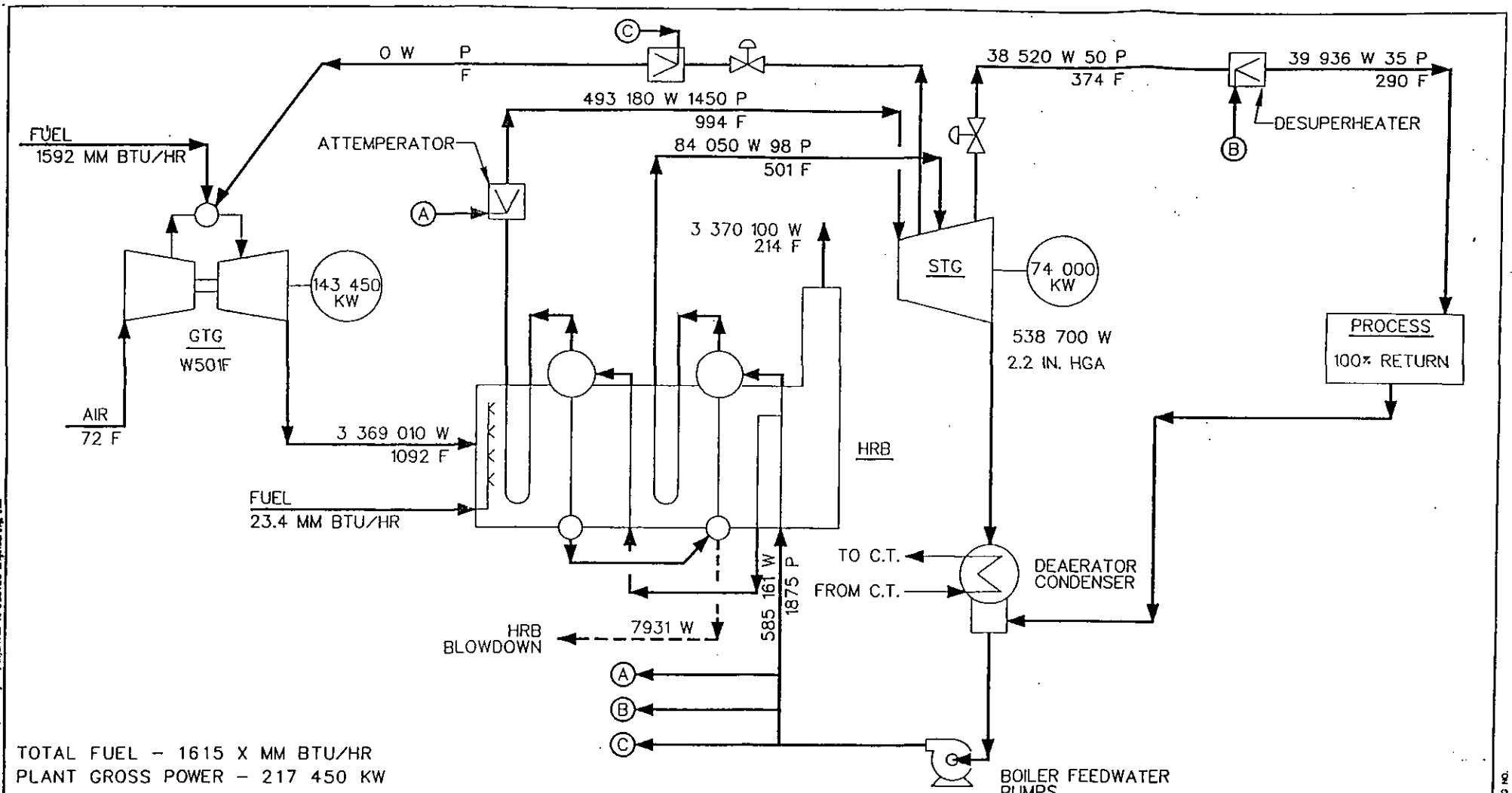
CALC. TCE	DATE 8-25-92
DWN. ROP	DATE 8-25-92
CHK.	DATE
APPV.	DATE

DESTEC ENGINEERING

W501F
FLOW DIAGRAM
CASE: WINTER DES GAS UNFIRED

PROJECT NO.: 1253
CLIENT: TIGER BAY COGEN
DWG. NO.: 1253-M-017.03
REV.: 0

DWG NO.
RDP
DB2392



LEGEND
P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

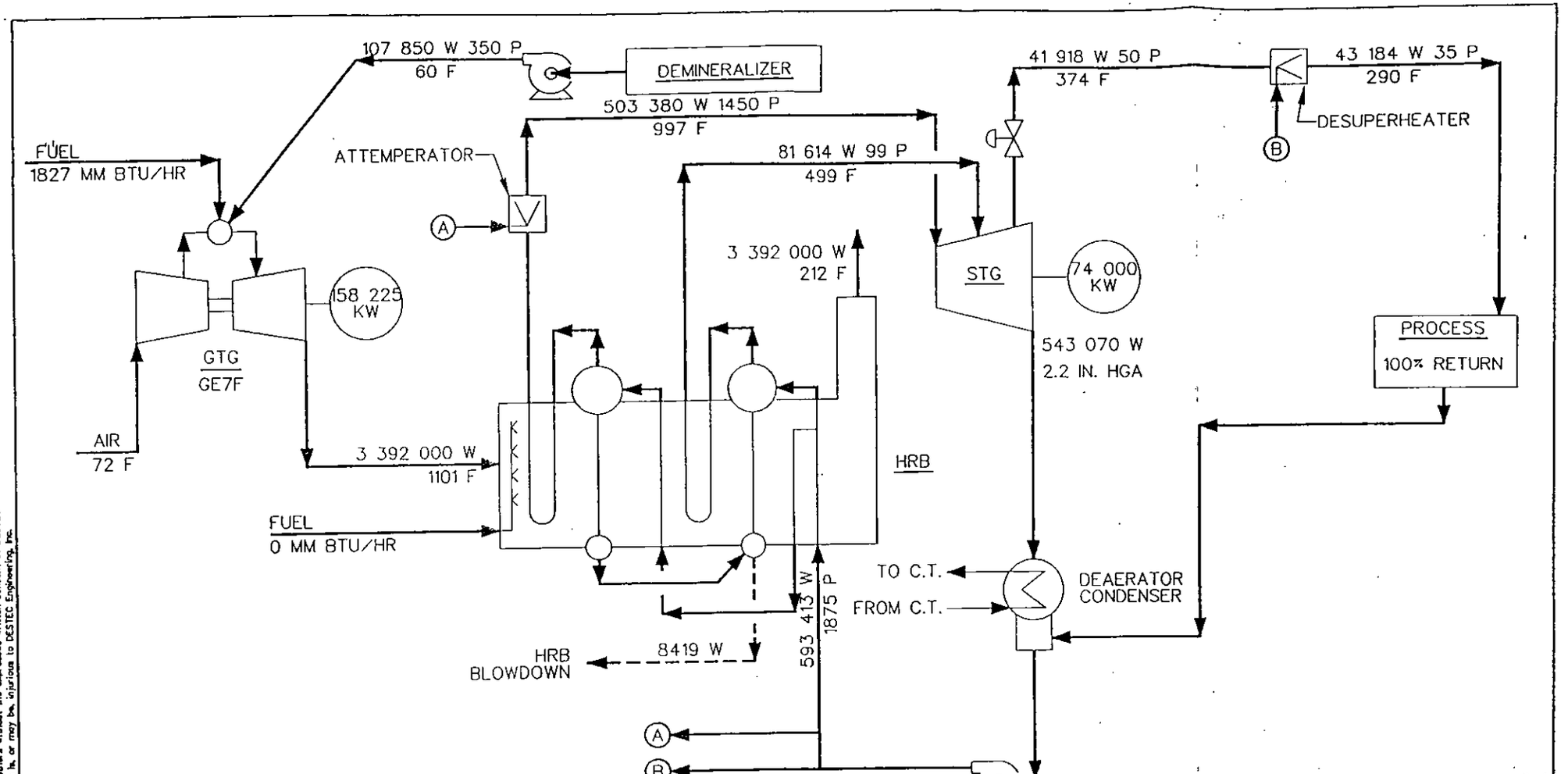
SCALE : NONE
CALC. TCE DATE 8-25-92
DWN. RDP DATE 8-25-92
CHK. DATE
APPV. DATE

DESTEC ENGINEERING

W501F
FLOW DIAGRAM
CASE: AVG AMB GAS UNFIRED

PROJECT NO: 1253
CLIENT: TIGER BAY COGEN
DWG. NO: 1253-M-017.04
REV. 0

DWG NO.
RDP
042592



LEGEND

P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

SCALE : NONE

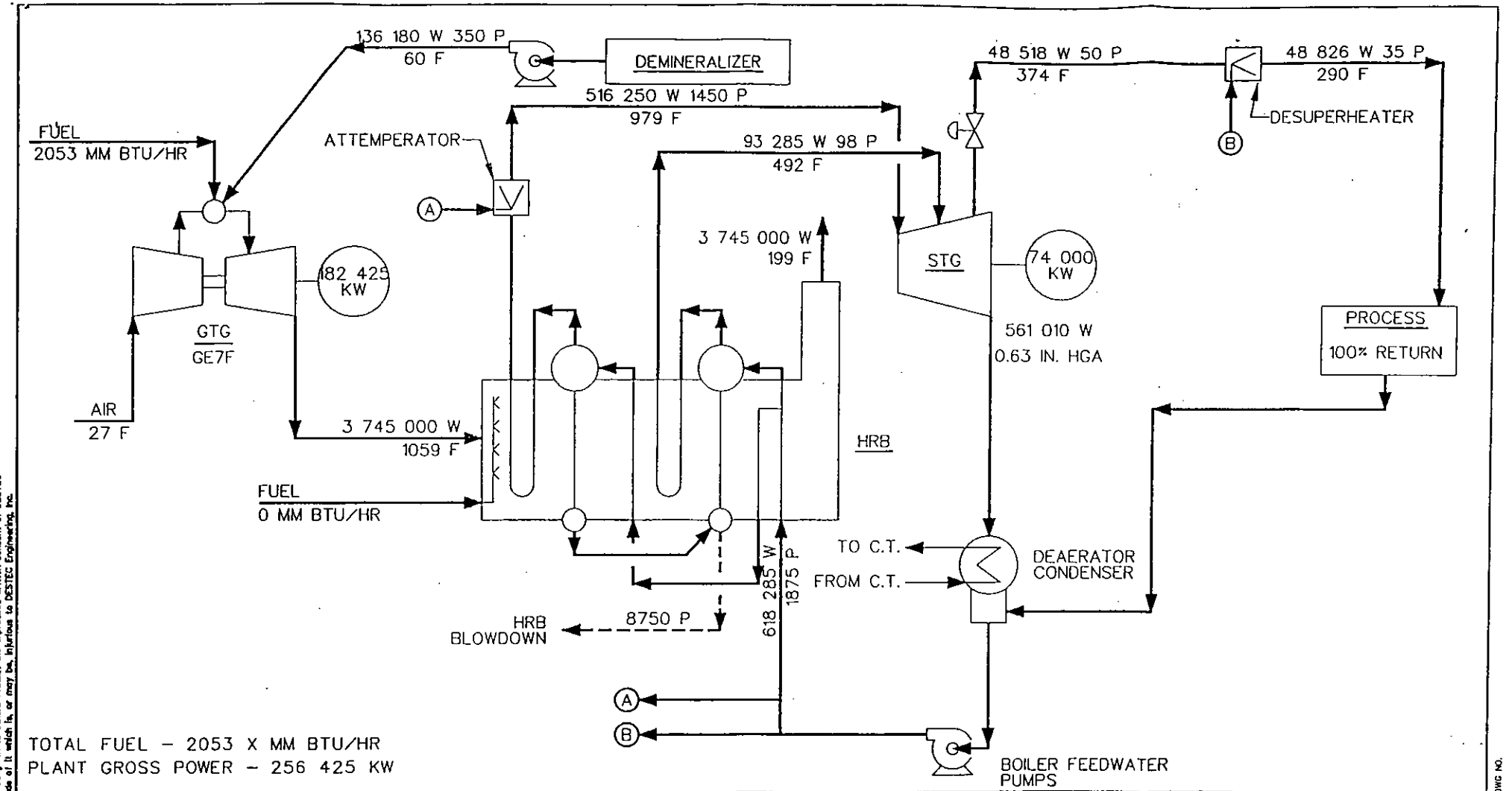
CALC. TCE	DATE 8-25-92
DWN. BHG	DATE 8-25-92
CHK.	DATE
APPV.	DATE

DESTEC ENGINEERING

GE PG72221 (FA) FLOW DIAGRAM CASE: AVG. AMB. OIL, UNFIRED

PROJECT NO: -1253
CLIENT: TIGER BAY COGEN
DWG. NO: 1253-M-017.05
REV. 0

DWG NO.
BHG
082392



TOTAL FUEL – 2053 X MM BTU/HR
PLANT GROSS POWER – 256 425 KW

LEGEND
P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

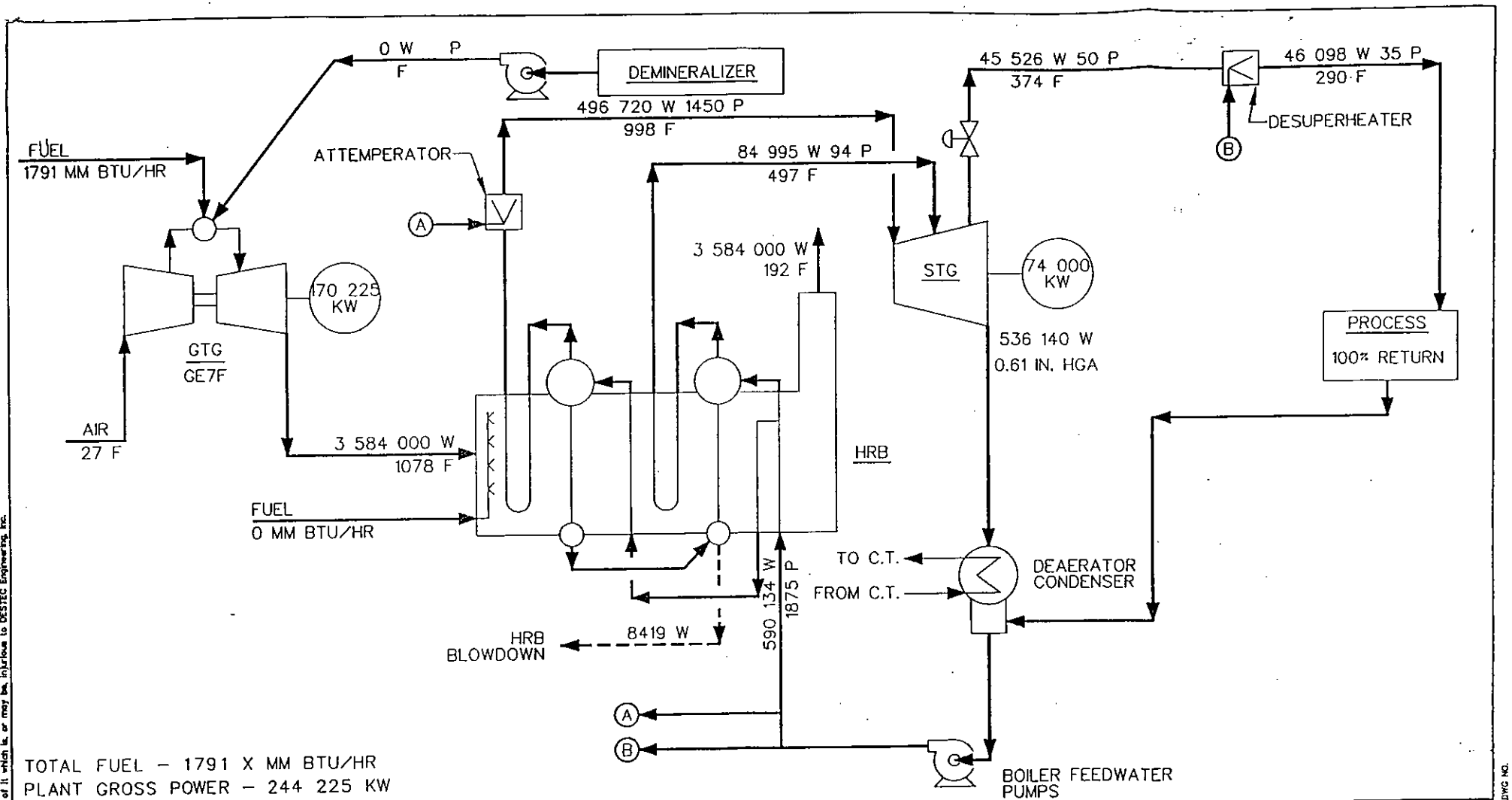
SCALE : NONE
CALC. TCE DATE 8-25-92
DWN. BHG DATE 8-25-92
CHK. DATE
APPV. DATE

DESTEC ENGINEERING

GE PG7221 (FA)
FLOW DIAGRAM
CASE: WINTER DES. OIL UNFIRED

PROJECT NO: 1253
CLIENT: TIGER BAY COGEN
DWG. NO: 1253-M--017.06
REV. 0

DWG NO. BHG 082592



TOTAL FUEL – 1791 X MM BTU/HR
PLANT GROSS POWER – 244 225 KW

LEGEND
P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

SCALE: NONE

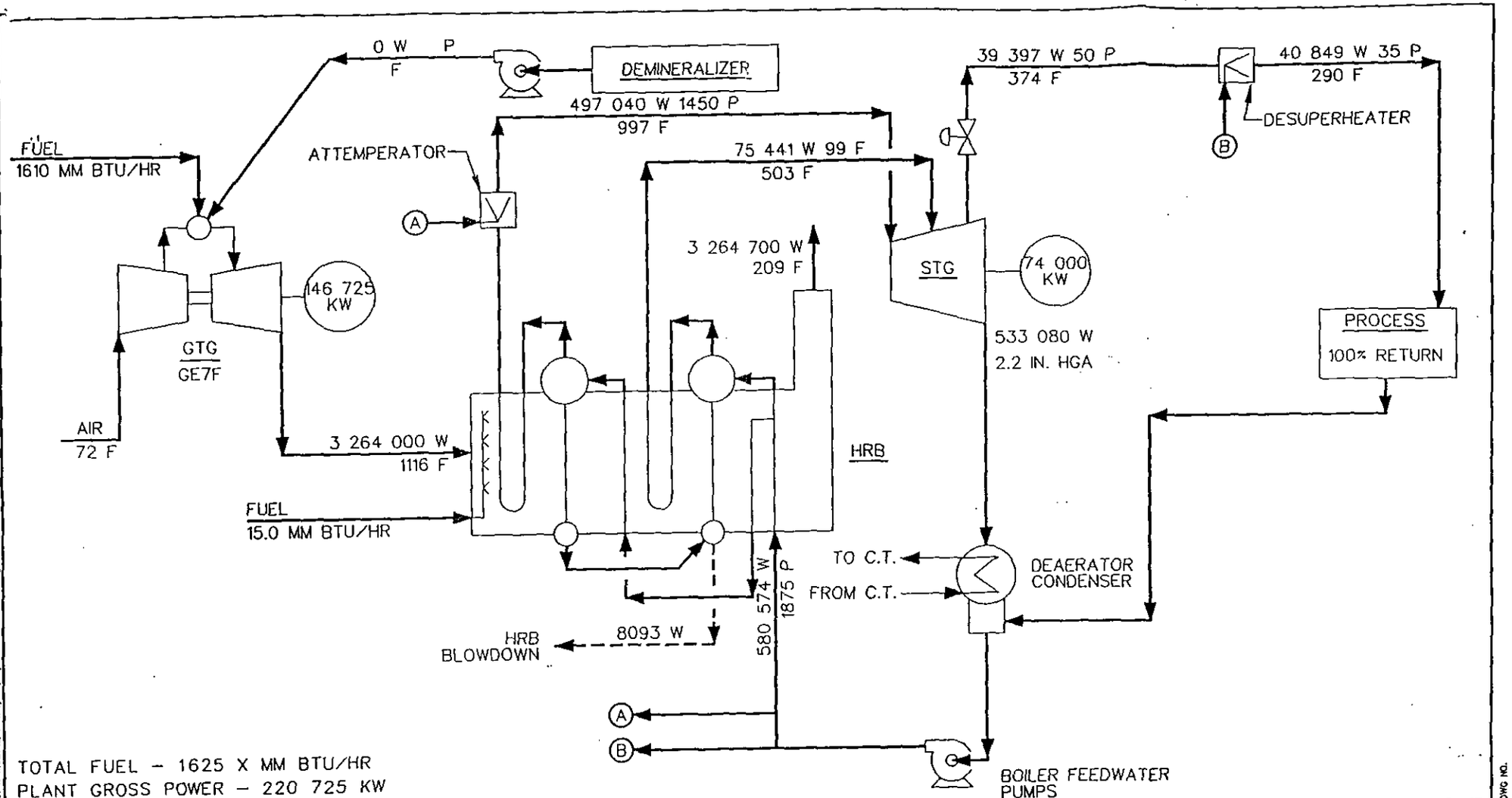
CALC.	TCE	DATE 8-25-92
DWN.	BHG	DATE 8-25-92
CHK.		DATE
APPV.		DATE

DESTEC ENGINEERING

GE PG7221 (FA)
FLOW DIAGRAM
CASE: WINTER DES GAS UNFIRED

PROJECT NO: 1253
CLIENT: TIGER BAY COGEN
DWG. NO: 1253-M-017.07
REV. 0

DWG NO. 082592 BHG



TOTAL FUEL – 1625 X MM BTU/HR
PLANT GROSS POWER – 220 725 KW

LEGEND
P = PSIG
H = BTU/LB
F = °F
KW = KILOWATTS
W = LB/HR

NO.	DATE	REVISION	BY	APPV.

SCALE: NONE
CALC. TCE DATE 8-25-92
DWN. BHG DATE 8-25-92
CHK. DATE
APPV. DATE

DESTEC ENGINEERING

GE PG7221 (FA)
FLOW DIAGRAM
CASE: AVG. AMB. GAS FIRED

PROJECT NO.: 1253
CLIENT: TIGER BAY COGEN
DWG. NO.: 1253-M-017.08
REV.: 0

DWG NO.
BHG
032592

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

June 22, 1992

Mrs. Chris Shaver, Chief
Permit Review and Technical Support Branch
National Park Service-Air Quality Division
Post Office Box 25287
Denver, Colorado 80225

Dear Mrs. Shaver:

RE: Central Florida Power Limited Partnership
206 MW Cogeneration Facility
Polk County, PSD-FL-190

The Department has received the above referenced PSD application. Please review this package for completeness and forward your comments to the Bureau of Air Regulation by July 10, 1992. The Bureau's FAX number is (904)922-6979.

If you have any questions, please call Mirza Baig or Cleve Holladay at (904)488-1344 or write to me at the above address.

Sincerely,

Patricia G. Adams

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

CHF/pa

Enclosures

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

June 22, 1992

Ms. Jewell A. Harper, Chief
Air Enforcement Branch
U.S. EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30308

Dear Ms. Harper:

RE: Central Florida Power Limited Partnership
206 MW Cogeneration Facility
Polk County, PSD-FL-190

The Department has received the above referenced PSD application package. Please review this package and forward your comments to the Department's Bureau of Air Regulation by July 10, 1992. The Bureau's FAX number is (904)922-6979.

If you have any questions, please contact Mirza Baig or Cleve Holladay at (904)488-1344 or write to me at the above address.

Sincerely,

Patricia G. Adams

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

CHF/pa

Enclosures

DESTEC ENGINEERING

DESTEC ENGINEERING, INC.
2500 CITYWEST BLVD., SUITE 1700
P.O. BOX 4411
HOUSTON, TEXAS 77210-4411
(713) 974-8200

June 23, 1992

Mr. Clair Fancy
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Central Florida Power Limited Partnership

Dear Clair:

Please find enclosed a copy of the "Letter of Authorization" which was not included in our permit application and prevention of significant deterioration analysis for a 206-MW cogeneration facility. The application was submitted on June 12, 1992.

I will be contacting you in a week to review the initial comments your staff may have. In the meantime, please call if you have any questions.

Sincerely,

Robert S. Chatham, P.E.
Senior Environmental Engineer

RSC:tk

cc: Kennard F. Kosky, KBN
Barry Andrews, FDER
Mirza Baig, FDER
File

DESTEC ENGINEERING

DESTEC ENGINEERING, INC.
2500 CITYWEST BLVD., SUITE 1700
P.O. BOX 4411
HOUSTON, TEXAS 77210-4411
(713) 974-8200

June 12, 1992

TO WHOM IT MAY CONCERN:

Subject: Letter of Authorization

Please be advised that Robert I. Taylor, Project Manager, is authorized to represent Central Florida Power Limited Partnership in matters relating to necessary permits and approvals required from federal, state, county, and local regulatory authorities in the areas of air, water and land issues.

Sincerely,

Robert O. Rogers

Robert O. Rogers
President, Central Florida DGE Inc.
Managing General Partner of
Central Florida Power Limited Partnership

tk

SENDER:

- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- 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 next to the article number.

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. Robert I. Taylor
Project Manager
Central Florida Power, L.P.
2500 City West Blvd., Sutie 150
Houston, TX 77042

4a. Article Number
P 710 058 545

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

5. Signature (Addressee)

6. Signature (Agent)

7. Date of Delivery
7-22-92

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

PS Form 3811, October 1990 *U.S. GPO: 1990—273-861

DOMESTIC RETURN RECEIPT

P 730 058 545

Certified Mail Receipt
No Insurance Coverage Provided
Do not use for International Mail
(See Reverse)

Sent to: Mr. Robert I. Taylor, Centra FL Power, L.P.	
Street & No. 2500 City West Blvd.	
P.O., State & ZIP Code Houston, TX 77042	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Address of Delivery	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form 3800, June 1990

Mailed: 7-14-92
Permit: AC 53-214903
PSD-FL-190

Florida Department of Environmental Regulation

Twin Towers Office Bldg. ● 2600 Blair Stone Road ● Tallahassee, Florida 32399-2400

Lawton Chiles, Governor

Carol M. Browner, Secretary

July 14, 1992

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Robert I. Taylor, Project Manager
Central Florida Power, L.P.
2500 City West Blvd., Suite 150
Houston, Texas 77042

Dear Mr. Taylor:

On June 15, 1992, the Department received a PSD permit application to construct a 206 MW cogeneration power plant at the U.S. Agri-Chemicals Complex near Ft. Meade, Florida and deemed it incomplete. Please provide the following information:

1. Section 1-1 states the electrical output of the cogeneration facility is 206 MW. The gas turbine (GT) is rated at 147 MW and the duct burner is rated at 74 MW giving a total of 221 MW. What is the maximum electrical output you would like to be permitted for this facility?

2. According to Section 1-1, two types of advanced GTs are being considered for this project. The Department must know the exact type of gas turbine you propose to install so that a BACT determination can be made. Accordingly, please submit detailed information of the unit selected. We will also need any available stack test data for that unit.

3. What is the maximum sulfur content of the natural gas you propose to burn? Provide a copy of any sulfur content guarantee that you may have from the supplier.

4. Submit an updated process flow diagram showing steam turbine and volumetric air flow rates.

5. In Section 4-12, Table 4-2, the emissions (25 ppmvd) for advance GT with dry low-NO_X technology appears to be incorrect. Also Table 4-2 should state the turbine size on which these figures are based.

6. Submit all emission calculations and not just an example calculation. These emission calculations shall be based on the selected turbine for this project.

7. What is the expected maximum ambient concentrations for the metals emitted?

8. Please provide an air quality related analysis (AQRV) of the impact this project will have on the Chassahowitzka National Wilderness Area (CNWA) for the pollutant NO_2. The AQRV analysis includes impacts to soil, vegetation, and wild life. This analysis also includes an assessment of impacts to the aquatic environment. Since the modeling information already provided with this application shows that the predicted NO_2 impact at the CNWA Class I area is less than the National Park Service (NPS) recommended significance level, the NPS has verbally stated that only a literature review is needed in order to comply with the AQRV analysis requirement.

9. Section 4.3.1.2, page 4-10, states that "While the increased firing temperature increases the thermal NO_X generated, this NO_X increase is controlled through combustion design." How much additional thermal NO_X generated is due to higher temperature?

10. On page 4-3, the estimated cost of SCR is reported to be about $7400 per ton of NO_X removed and it exceeds $10,000 per ton of pollutant removed when the net emissions of all pollutants (exclusive of CO_2) are considered. Provide us with the names and addresses of all manufacturers that were contacted while developing capital and annualized cost estimates for this project.

The processing of your application will continue upon receipt of the above requested information. If you have any questions, please contact Mr. Mirza P. Baig at (904) 488-1344.

Sincerely,

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

CHF/MB/plm

cc: Bill Thomas, SWD
Ken Kosky, P.E., KBN Eng.
Robert Chatham, Destec Eng.
Jewell Harper, EPA, Atlanta
Chris Shaver, NPS

CC/MIRZA BAIG
LELENE HOLADAY
Plan to attend
Tuesday 10 am MTG

DESTEC ENGINEERING

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4/10/92

April 9, 1992

APIS N°020 40TPA5302380 1

Mr. Preston Lewis
Bureau of Air Regulations
Florida Department of Environmental Regulations
2600 Blairstone Road
Tallahassee, FL - 32399-2400

Subject: **Central Florida Cogeneration Plant**
Fort Meade, Polk County
Preliminary Information and Pre-Application Meeting

Dear Mr. Lewis:

The Central Florida Power Limited Partnership is planning a 210 MWe (nominal) cogeneration project at the U.S. Agri Chemicals Complex near Ft. Meade, Florida. The project will be called the Central Florida Cogeneration Plant. Destec Energy, Inc. is one of the partners, and is the developer of the project. Destec Operating Company will operate and maintain the cogeneration plant under contract to the Partnership. All pollution-emitting activities, including emission controls, will be under Destec control. Destec Engineering, Inc., an affiliate of Destec Energy, is under contract to the limited partnership to perform engineering services for the project, including air permitting.

The project will consist of one gas turbine (GT) electric generating unit, equipped with a duct burner-fired heat recovery steam generator (HRSG). The GT/HRSG unit will be primarily fired with natural gas, distillate oil will be used as the emergency backup fuel for the GT.

This letter presents a brief overview of the project, our preliminary analysis of the air emissions due to the project, and our understanding of the air permitting requirements and air regulations which apply to the project. We have concluded that a FDER construction permit will be required, and that certain NSPS will apply. We have also concluded that a PSD permit will be required for carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOC), particulate matter (PM), and particulate matter less that 10 microns (PM-10).

We understand that PSD review will not apply for sulfur dioxide (SO_2) and other PSD-regulated pollutants, because the project will not cause significant emissions for these pollutants. We further understand that Nonattainment New Source Review (NNSR) will not apply to the project's emissions, because the project is not located in a nonattainment area.

We look forward to meeting at the FDER on Tuesday, April 14, 1992 at 10:00 AM to discuss the project and confirm the project's permitting requirements, procedures, and timing. We are especially interested in obtaining FDER input regarding BACT considerations for NO_x, CO, VOC, PM, PM-10 and the timing of air dispersion modeling submittals. Destec Engineering,

Inc. has engaged the services of KBN Engineering (KBN) to prepare the air permit applications. Representatives of Destec, General Peat Resources and KBN will be present at the meeting.

Project Schedule

Contingent upon receipt of the necessary pre-construction approvals, construction of the Cogeneration Plant is scheduled to be financed by December 1992, construction begin by June 1993, and be operational by January 1995.

Project Overview

Attachment 1 to this letter shows the general location of the project in Florida and Polk County. Polk County is classified as "attainment" or "cannot be classified" for all criteria pollutants.

Attachment 2 shows the specific project location in the U.S. Agri Chemicals Complex near Ft. Meade. The project will provide process steam to the U.S. Agri Chemicals complex. Electric power will be supplied to the public utility grid.

Destec personnel will operate and maintain the cogeneration plant under contract to the Partnership. The cogeneration plant manager will be a Destec employee. The plant will be owned by the limited partnership. An affiliate of Destec Energy, Inc., General Peat Resources and EcoEnergy will have ownership interest in the partnership.

The project is evaluating different manufacturers of gas-fired turbines. The gas turbine unit will have a nominal electrical output of about 150 MWe, a maximum heat input of about 1900 MMBtu/hr (HHV), and will be equipped with dry low NO_x combustors. The gas turbine's exhaust will be routed to a duct burner-fired HRSG unit, normally unfired. The natural gas-fired duct burner for the HRSG unit is expected to have a maximum heat input of about 125 MMBtu/hr (HHV). The steam from the HRSG unit will power a steam turbine electrical generator, with a maximum output of about 74 MWe.

Approximately 40,000 lb/hr of low pressure steam will be exported to the U.S. Agri Chemical complex for use as thermal energy.

Electrical power will be sold to the public utility grid.

Project Emissions

By firing natural gas the gas turbine exhaust (entering the HRSG) will be limited to 25 ppmvd NO_x, at 15% oxygen, and 15 ppmvd CO. Advanced dry low NO_x technology combustors and other measures will be used to control the NO_x emissions from the project's gas turbine and duct burner while firing natural gas. The duct burners will be only fired on natural gas. The duct

burner NO_x emissions will be about 0.10 lb/MMBtu.

When firing distillate oil, the gas turbine exhaust entering the HRSG will be limited to 42 ppmvd NO_x at 15% oxygen and 30 ppmvd CO. Steam or water injection will be utilized for NO_x control when firing distillate oil. The annual distillate oil usage is anticipated to be approximately 350 hours per year.

The planned permit application will present calculations of maximum hourly and annual emission rates for all regulated pollutants for each emitting unit. For purposes of evaluating how PSD regulations may apply to the project, Destec has performed preliminary, worst-case emissions calculations of annual emissions. These calculations are summarized and discussed below.

Destec may present slightly different calculated emissions in the planned permit application, based on operational limitations that may be proposed to FDER as part of the requested permit.

In the preliminary, worst-case emissions calculations the single GT/HRSG is assumed to operate at maximum rated heat input, year-round. This calculational basis considerably over estimates the emissions that will actually occur, since (1) the gas turbine will at times be operated at less than maximum capacity and (2) the duct burner in the HRSG will not normally be operated. The following table summarizes the preliminary, worst-case emissions calculations and compares the calculated emissions to the PSD significance levels:

	Worst Case Project Emissions (T/yr)	**PSD Significance Level (T/yr)**
Carbon monoxide (CO)	324	100
Nitrogen oxides (NO_x)	750	40
Sulfur dioxide (SO_2)	39	40
Particulate matter (PM)[a] and PM-10	48	25/15
Volatile organic compounds (VOC)	58	40
Non-criteria PSD regulated pollutants	None or Negligible	Project emissions will be insignificant

[a] The permit application will conservatively assume that PM will consist 100% of PM-10.

Applicability of PSD and NNSR Review

Destec's understanding of the PSD regulations is that the planned Cogeneration Plant is not one of the 28 source types, therefore, the criterion of "major source" is 250 T/yr of any regulated pollutant. On that basis, and based on the preliminary emissions calculations summarized above, the cogeneration plant will be a major stationary source, since the plant will emit 250 T/yr or more CO and NO_x. Destec understands, therefore, that PSD is applicable to all PSD-regulated pollutants which the plant will emit in significant amounts. Destec further understands that, because the cogeneration plant will be a new "stationary source" under separate control from the U.S. Agri Chemical complex, netting of contemporaneous increases and decreases is not applicable. Therefore, Destec has concluded that PSD will apply to all pollutants for which significant emissions will occur from the new cogeneration plant. As shown on the table in the preceding section, the plant will be significant for CO, NO_x, VOC, PM and PM-10. Therefore, we understand that PSD review will apply to the project for CO, NO_x, VOC, PM and PM-10.

The plant will have insignificant emissions of SO_2, lead, and non-criteria PSD regulated pollutants. Therefore, we understand that the project will not be subject to PSD review for SO_2, lead, and non-criteria PSD-regulated pollutants. Also, we understand that the project will not be subject to NNSR review.

Applicability of NSPS Regulations

Based upon the preliminary project plans, we understand that the Cogeneration Plant will be subject to some of the New Source Performance Standards contained in:

- 40 CFR 60 Subpart GG: Stationary Gas Turbines
- 40 CFR 60 Subpart Db: Industrial - Commercial - Institutional Steam Generating Units

In addition, the project's duct burner-fired HRSG unit does not appear to not be subject to Subpart D or Da since the duct burners' maximum heat input capacity of 125 MMBtu/hr does not exceed the applicability level of 250 MMBtu/hr.

Regarding the NSPS for a gas turbine in 40 CFR 60 Subpart GG, the turbines will be subject to the Subpart GG limits for sulfur dioxide, which require that the exhaust gases do not exceed 150 ppmv SO_2 (at 15% O_2, dry basis) and that the fuel does not contain more than 0.8 percent sulfur by weight. The turbine and fuels will easily comply with these limits. We understand that the cogeneration plant will be required to periodically monitor and report fuel sulfur content in accordance with the Subpart GG NSPS.

Regarding the NSPS for steam generating units in 40 CFR 60 Subpart Db., the project's duct burner-fired HRSG unit will be subject to the NSPS, because the maximum fuel firing rate (about 125 MMBtu/hr/duct burner (HHV)) is greater that the NSPS applicability threshold of 29 MWe (100 MMBtu/hr). The Subpart Db NSPS requires that affected duct burners meet a NO_x emission limit of 0.2 lb/MMBtu heat input, which is applicable to firing natural gas in duct burners of combined cycle systems (see 40 CFR 60.44b(e)). The planned duct burners will have

no difficulty in meeting the NSPS. The duct burners will be fired only on natural gas.

CO BACT Considerations

The gas turbines dry low NO_x combustors are guaranteed to limit CO to 15 ppmvd, natural gas, and limit CO to 30 ppmvd, firing distillate oil and injecting steam or water. At the CO emission rates which correspond to this low concentration, the ambient CO impacts of the project are expected to be negligible (i.e., well below FDER and EPA significance thresholds). Given the low CO emissions and negligible impacts, we currently anticipate proposing the low NO_x controls as BACT for CO. We would like to obtain FDER input prior to preparing our BACT analysis and permit applications.

Contents of Air Permit Applications

We plan to submit two separate permit application documents for the Cogeneration Plant:

- FDER construction permit application
- PSD application

Destec Engineering and KBN are now beginning to assemble the information and perform the analysis to be included in the permit applications.

The FDER permit application is expected to include the following information:

- Completed FDER permit application forms
- Certifications (i.e. professional engineers certification)
- Description of the project and the process, with an area map, plot plant and process flow diagram. Emphasis will be placed on sources of emissions and emission control measures.
- BACT analysis for CO, NO_x, SO_2, PM, PM-10 and VOC
- Description of applicable air regulatory requirements
- Appendicized emission rate calculations, along with the inputs and assumptions used.
- Dispersion modeling analysis in accordance with protocols agreed upon with FDER.

The PSD permit application will include much of the same information included in the state application, except that the PSD BACT analysis and any dispersion modeling analysis will address only CO, NO_x, PM, VOC, and PM-10. The PSD application's BACT analysis for NO_x and CO will be quite brief, because we understand that our planned BACT measures for NO_x and CO represent the "top" level of BACT, consistent with current FDER and EPA policies. The PSD application's BACT analysis for PM and PM-10 is also expected to be quite brief, because we are aware of no control techniques (aside from modern design and good combustion

practices) for PM/PM-10 emissions from gas-fired/oil-fired gas turbines and gas-fired duct burners.

With respect to dispersion modeling, we currently anticipate submitting modeling analysis when the permit applications are submitted to FDER. We anticipate that a separate modeling protocol meeting with FDER modelers will be required to confirm specific procedures prior to performing the modeling.
We look forward to meeting with you on April 14th to confirm the air permitting requirements and timing for the project. In the interim, if there are any questions regarding the project or this letter, please call me at (713) 735-4087.

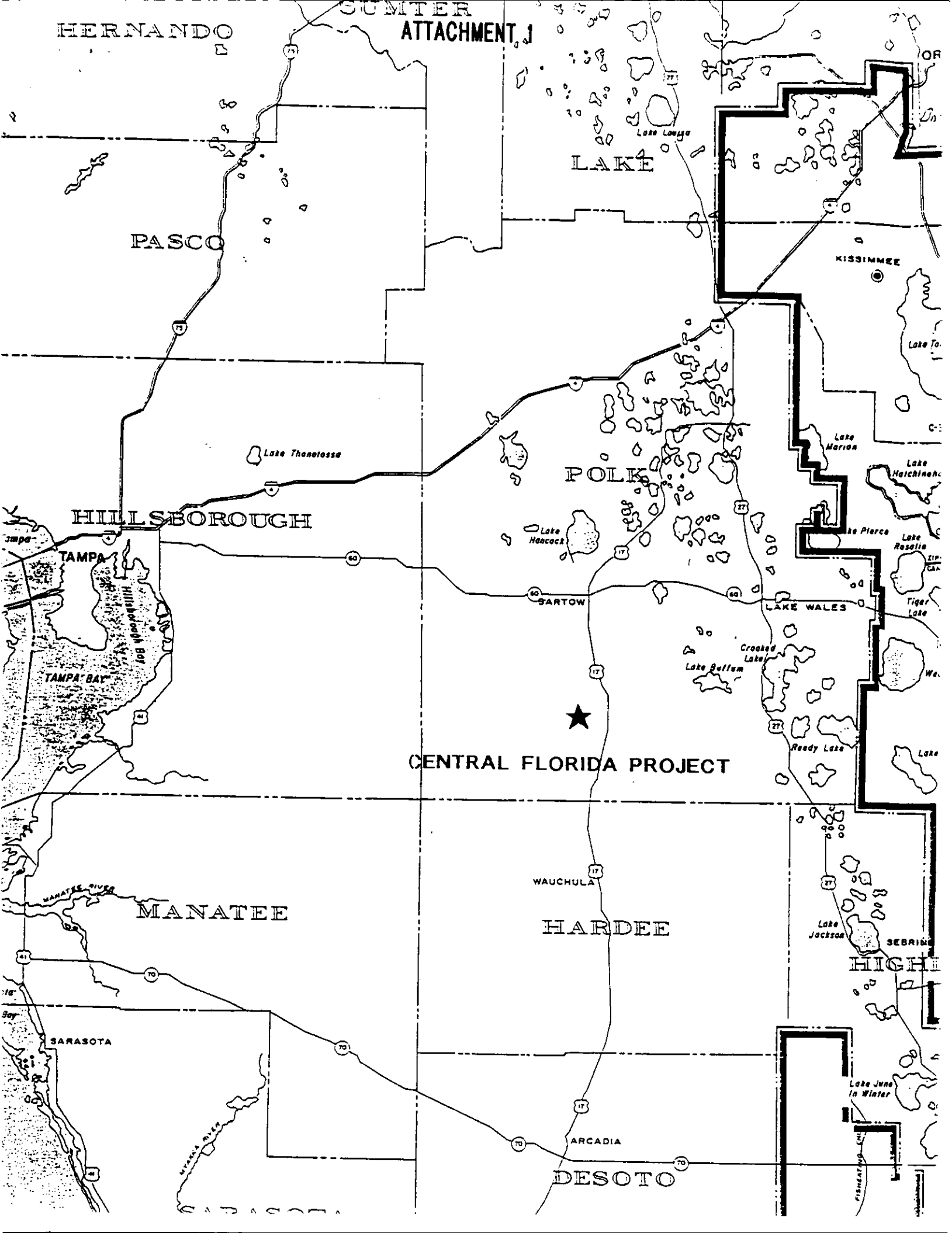
Sincerely,
DESTEC ENGINEERING, INC.

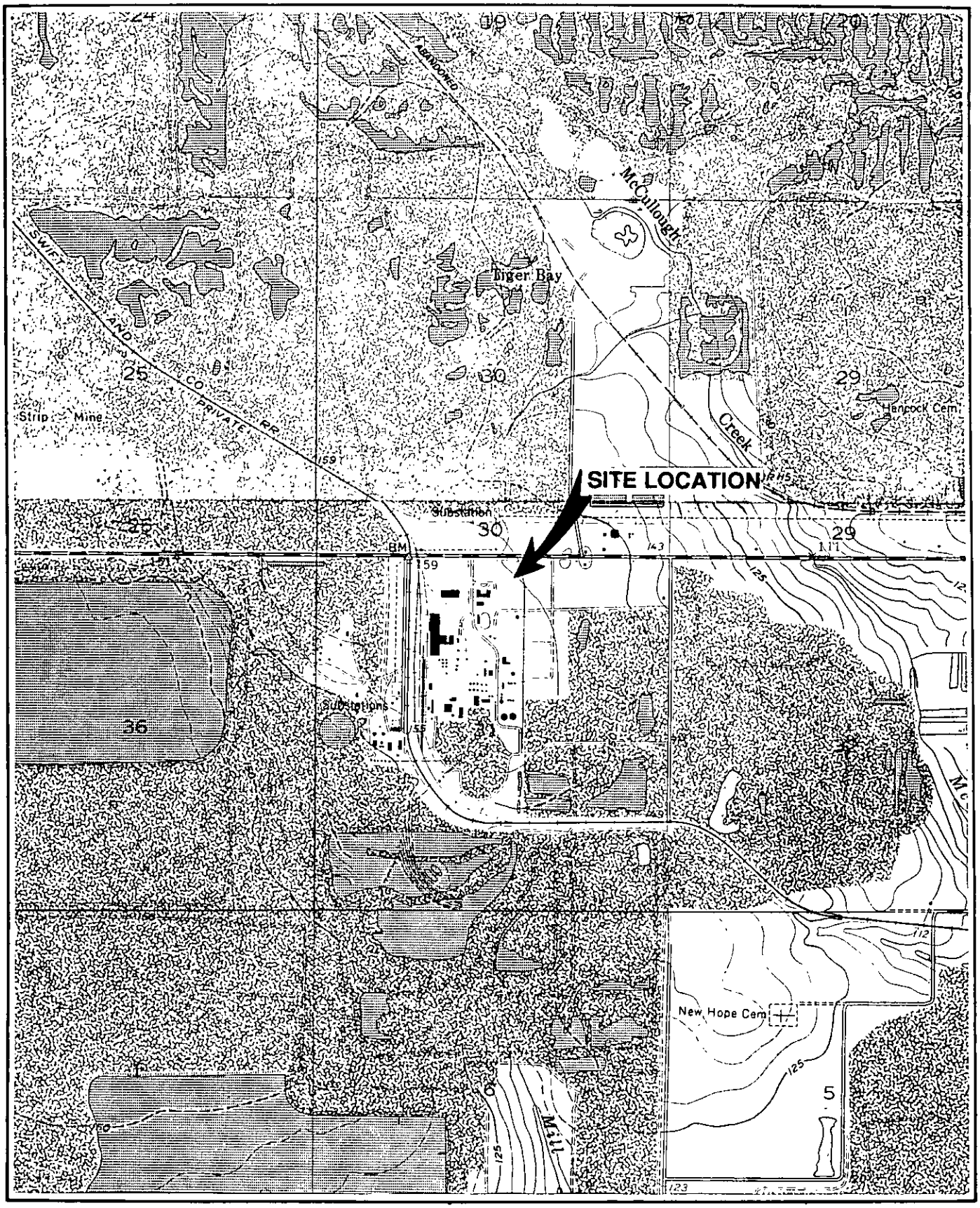
Robert S. Chatham
Environmental Engineer

cc: Mr. J. W. Kenny, General Peat Resources
Mr. Ken Kosky, KBN

Attachments:
1 - Project Location in Florida and Polk County
2 - Project Location within U.S. Agri Chemicals Complex

ATTACHMENT 1





ATTACHMENT 2
PROJECT LOCATION MAP

SOURCES: USGS, 1987; KBN, 1992.

DESTEC ENGINEERING

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) and 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AC 53-214903
PSD-FL-190

Applicant's Name: Central Florida Power, L.P.
Tiger Bay Cogeneration Plant

With regard to the above referenced application, the applicant hereby with full knowledge and understanding of applicant's rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed by law. Said waiver is made freely and voluntarily by the applicant, with full knowledge, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 15th day of January 1993.

The undersigned is authorized to make this waiver on behalf of the applicant.

Signature

Robert I. Taylor, Project Manager
Name (Please Type or Print)

Revised April, 1990

DESTEC ENGINEERING

DESTEC ENGINEERING, INC.
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HOUSTON, TEXAS 77210-4411
(713) 974-8200

Date: December 30, 1992

Page 1 of 2

To: Preston Lewis

From: Robert Chatham

	Document	Date/ Revision	Job No./ Project	Note
1.	Waiver of 90 Day Time Limit		1253	
2.				
3.				
4.				

Notes:

Cover

Package

cc: Teresa Heron (FDER)

Patti Adams (FDER)

File

1253