GAINESVILLE REGIONAL UTILITIES
Strategic Planning

September 19, 1994

Mr. Clair Fancy, Bureau Chief
Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Gainesville Regional Utilities
Proposed Deerhaven Combustion Turbine No. 3
September 2, 1994 Meeting Summary/Supplemental BACT Analysis

Dear Mr. Fancy:

Gainesville Regional Utilities ("GRU") appreciated the opportunity to meet with you and your staff on September 2, 1994 to discuss the major issues related to the permitting of Deerhaven Combustion Turbine No. 3. Pursuant to our discussions, GRU's understanding of these issues, specifically the NOx emission limitations, compliance demonstrations, and the fuel-bound nitrogen ("FBN") allowance, is as follows:

I. NOx Emission Limitations

The permit shall contain NOx limits as described below:

a) Concentration limits (ppmvd) - Natural gas firing: 15 ppmvd; fuel oil firing: 54 ppmvd (pending a final decision on the attached Supplemental BACT analysis); daily 24-hour block averages (midnight-midnight) @ 15% O_2, on a dry basis.

b) Mass emission limit (#/hr) - Natural gas firing: 58 lbs/hr; fuel oil firing: 237 lbs/hr (pending a final decision on the attached Supplemental BACT analysis); daily 24-hour block averages (midnight-midnight). These are the emission rates under the worst case operating conditions (i.e., 100% load, 20°F) as indicated in Attachment A to the Prevention of Significant Deterioration ("PSD") permit application.

c) Scaled adjustment for FBN - Due to the compliance method, the Department indicated a preference for a single NOx concentration limit rather than a scaled limit to account for FBN.

ISO correction of NOx concentrations will not be required except as necessary to demonstrate compliance with the 40 CFR 60 Subpart GG New Source Performance Standards.

(904) 334-3400 ext. 1261 P.O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (904) 334-3151

demonstrate compliance with the 40 CFR 60 Subpart GG New Source Performance Standards.

II. NOx Compliance Methods

Compliance with the NOx emission limitations as described in I.a) and I.b) above shall be determined as follows:

a) Concentration limits (ppmvd) - Continuous emission monitoring system ("CEMS").

b) Mass Emission Limit (lbs/hr) - Periodic compliance test or CEMS. Based upon further evaluation, GRU's preference would be through a NOx CEMS and F-factor calculations (EPA Method 19). Please note that a volumetric flow monitor is not proposed for this unit.

III. Fuel-Bound Nitrogen

GRU agreed to submit a Supplemental BACT analysis (included herein as Attachment 1) for fuel-bound nitrogen. This analysis demonstrates that using a fuel specification to control NOx emissions is not cost effective. Therefore, GRU is requesting a NOx permit limit of 54 ppmvd and 237 lbs/hr when firing fuel oil. As demonstrated in the PSD permit application, this level of emissions would not have adverse effects on air quality.

GRU trusts this is an accurate summary of the meeting discussions. I will contact your staff next week to discuss the Supplemental BACT analysis and the proposed permit conditions. In the interim, if the Department has any questions or disagrees with the discussion summary, please call me at (904) 334-3400 Ext. 1284.

Sincerely,

Yolanta E. Jonynas
Sr. Environmental Engineer

xc: D. Beck
J. Braswell, FDEP
P. Cunningham, HBGS
D. Fulle, Enserch Environmental
T. Herron, FDEP
S. Manasco
B. Mitchell, FDEP

SUPPLEMENTAL BACT ANALYSIS FOR
FUEL BOUND NITROGEN
PROPOSED DEERHAVEN COMBUSTION TURBINE No.3
Gainesville Regional Utilities
September 19, 1994

INTRODUCTION

Gainesville Regional Utilities ("GRU") is proposing to install a General Electric ("GE") MS70001EA simple cycle combustion turbine, equipped with recently developed, dry low NOx ("DLN") combustors. The unit is expected to be permitted to operate, while burning the unit's primary fuel, which is natural gas, with a continuous NOx emission rate of no more than 15 ppmvd @ 15% O2. Planned to become operational in mid 1995, this will be the first unit in Florida operating with a permit limit of less than 25 ppmvd @15% O2.

While burning distillate fuel oil, which is the unit's secondary or backup fuel, NOx control will be achieved using a more conventional water injection technology. Water injection in a simple cycle combustion turbine acts to control thermally generated NOx, but nitrogen bound in the fuel is directly converted to NOx through the combustion process. At higher levels of fuel bound nitrogen ("FBN"), emissions will be correspondingly higher. Accordingly, GRU is requesting a fuel-bound nitrogen allowance for fuel oil burned up to .03%.

PURPOSE AND SCOPE

The Florida Department of Environmental Protection has requested GRU to demonstrate that setting a continuous (24 hour block average) emission limit of 42 ppmvd @15% O_2, while operating on fuel oil, would impose costs upon GRU that would not be feasible according to EPA's Best Available Control Technology ("BACT") guidelines.

There are several approaches for controlling NOx to a limit of 42 ppmvd NOx @15% O_2 while burning oil in a DLN combustor turbine including:

1. Over controlling with water; and
2. Burning oil with less than .015% FBN.

The technical feasibility of over-controlling with water was determined by GE, the manufacturer of the turbine. The implications of being required to burn oil with less than .015% FBN on fuel price and availability were assessed by a survey of fuel suppliers in Florida.

OVER-CONTROLLING WITH WATER

One way to compensate for FBN is to further reduce thermal NOx by injecting additional water. For example, to reduce NOx from 54 to 48 ppmvd @15%O2 would require reducing thermal NOx by 6 ppmvd with the following consequences (see Attachment 1 - July 27 letter from General Electric):

1. Increased high-quality water consumption (5,000-6,000 lb/hr);
2. Adverse effects on equipment life and additional maintenance cycles;
3. Higher carbon monoxide ("CO") and uncontrolled hydrocarbon ("UHC") emissions;
4. Decreased unit efficiency (40-60 BTU/KWH).

These conditions would be even more exacerbated if water is injected to control to the 42 ppmvd level, if it is even technically possible. Therefore, given the environmental consequences and potential for damage to the unit, over-control with water is not considered feasible nor prudent.

LOW FBN FUEL ANALYSIS

A survey was conducted to assess the availability and cost of No. 2 low sulfur fuel oil with a maximum FBN of .015%. A fuel solicitation was prepared, containing fuel specifications (e.g. less than .05% sulfur) and requesting quotes with a guaranteed FBN less than or equal to .015% and without a guaranteed FBN content (Attachment 2). This threshold was selected because GE has represented that a 42 ppmvd @15% O2 limit can be achieved with FBN up to .015%. The request for quotation was submitted to nine fuel suppliers. Five quotations were obtained with only one supplying a FBN guarantee. The results are summarized in Table 1 (Attachments 3 through 9).

TABLE 1
NO. 2 LOW SULFUR FUEL OIL
QUOTE SUMMARY
($/gallon F.O.B Gainesville, Fl.)

Vendor	Without Fuel-Bound Nitrogen Guarantee	With Fuel-Bound Nitrogen $\leq$.015% Guarantee	Difference
Steuart	.5905	No Bid	na
Central Oil	.5982	No Bid	na
Coastal	.6087	.6304	.0217
BP Oil	.5836	No Bid	na
MGRefining	No Bid	No Bid	na
average	.5952	.6304	.0352

The only supplier willing to guarantee the FBN quality of its oil charged a .0217 $/gallon premium (3.6%).

During the survey process it became apparent that the market for oil with low FBN content is currently not well developed in Florida, and that in most cases, FBN is not a factor in fuel oil purchasing decisions. BP Oil (British Petroleum) was known to supply oil for units requiring low FBN oil to meet permit requirements, so BP personnel were contacted for a more in depth discussion when BP failed to offer a price for guaranteed low FBN fuel oil. BP indicated that to serve the units in question, each batch of oil is tested prior to delivery. The FBN quanity in the oil is not under the control of the supplier, and its availability depends upon the original source of the crude oil.

Given the overall lack of FBN sampling in the fuel oil market, it is difficult to determine the reduction in FBN that would be attained by requiring a maximum FBN content of .015%. Accordingly, the cost per ton (see attachment 10-NOx Reduction Calculations) using the difference of the bid prices from Coastal (minimum differential) as well as the difference between the average of the non-guarantee prices and the Coastal guarantee price (average differential), is shown below:

Table 2
NOx Control Costs Using Fuel Specification
($/ton NOx)

Minimum differential	$12,136
Average differential	$19,687

These costs are greater than would be considered cost-effective pursuant to EPA BACT guidelines. In addition, these costs do not reflect any infrastructural changes to the on-site fuel storage and handling facilities which may be required.

SUMMARY AND DISCUSSION

Given the environmental consequences and potential for damage to the unit from over-control with water, this alternative for compensating for FBN concentration greater than .015% is not considered feasible nor prudent.

The results of the survey indicate that the market for low FBN No. 2 fuel oil is not yet fully developed, since over 80% of the suppliers responding to GRU's solicitation have both not adopted a fee structure reflecting FBN and are not willing to guarantee the FBN content of their supply at this time. Furthermore, the availability of the lower FBN fuel is not assured at any given point in time.

A single data point was found indicating the premium that the market will currently bear for low FBN fuel oil is $.0217/gallon, or about 3.6%. At this premium the cost per ton of NOx reduction is not cost effective.

REFERENCE

1. Enserch Environmental Corporation, Prevention of Significant Deterioration Permit Application for Gainesville Regional Utilities Deerhaven Generation Station Combustion Turbine Addition. February 1994

ATTACHMENT 1

GE Power Generation Engineering

Project Engineering
General Electric Company, Bldg. 2, Suite 430
One River Road, Schenectady, NY 12345 USA
Phone: (518) 385-9219 Dial Comm: 8*235-9219
FAX: (518) 385-5128 FAX Dial Comm: 8*235-5128

Date: July 27, 1994

Copies:

R Beaudoin	53-322	MM Schorr	2-647
W Cantillion	GVL 236	R Gordon	23-113
J Chalfin	22-237	R Pavri	37-2C
M Cardano	Tampa	LB/File	

Subject: **Gainesville Regional Utilities**
GR0292 - Deerhaven Combustion Turbine #3

To: Doug Beck / Yolanta E Jonynas
Gainesville Regional Utilities
301 SE 4th Avenue
Gainesville, FL 32601

This letter summarizes the GE position on organic NO_x yield for combustors burning fuels containing elevated levels (above 0.015% by weight) fuel bound nitrogen (FBN). The term organic NO_x is used to differentiate between NO_x derived from organic FBN and thermal NO_x derived from the reaction atmospheric nitrogen at elevated temperatures and pressure within combustors. The conversion rate of FBN to organic NO_x is a function of combustor design, operating conditions and FBN content. Regarding the subject fuel, which has been conservatively estimated to contain 0.03% by weight FBN, previous studies (with FBN levels ranging from 0.01%-1.0%+ by weight) on GE conventional diffusion flame gas turbine combustors have shown nearly a 100% conversion of FBN to exhaust NO_x.

At any given level of fuel bound nitrogen, Dry Low NO_x (DLN) lean pre-mixed combustors are expected to have a higher NO_x yield than conventional diffusion flame combustors. The air flow distribution within DLN lean pre-mixed combustors, even when operating in diffusion mode on liquid (distillate) fuel, is such that the flame zone is much leaner than in conventional diffusion flame combustors. Both GE studies and available literature (see References 1 and 2) indicate leaner flames will have increased NO_x yields and resultant higher exhaust NO_x levels. Diluent injection technology (water or steam injection) is effective in controlling thermal NO_x, but has no effect in reducing organic NO_x. Actually water or steam injection in conventional diffusion flames increases the conversion of organic FBN to exhaust NO_x. In light of the above, plus the fact that we have no DLN combustor data (either laboratory or field), upon which to base a guarantee GE cannot commit to guarantees at less than 100% yield. There would not be any recourse if such a guarantee were made and subsequently could not be met.

Based on the above, GE's position is that the Gainesville permit for Deerhaven Combustion Turbine #3 should be based on NO_x emissions levels reported in our proposal (54 ppmvd NOx @ 15% O2), when burning distillate fuel containing 0.03% (by weight) nitrogen in the fuel. Note that total NO_x of 54 ppmvd is calculated by assuming 42 ppmvd thermal NOx contribution and 12 ppmvd organic NOx from fuel bound nitrogen based on 100% yield at the 0.03% level by weight. The 12 ppmvd NO_x allowance is in accordance with the guidelines in 40CFR60 subpart GG.

A reduction in total exhaust NO_x level (say from 54 ppmvd to 48 ppmvd @ 15% O_2) would mean that the Deerhaven unit would have to operate at a thermal NO_x level of 36 ppmvd @ 15% O_2 instead of 42 ppmvd, since organic NO_x is not reduced by water injection. Should Gainesville Regional Utilities be required to operate the Deerhaven Combustion Unit #3 at the lower total NO_x level (I.E. 48 ppmvd NO_x) exhaust this would raise a number of serious issues which are of concern and these are as follows: First, there is a significant increase in water usage (on the order of 15-20% which corresponds to about 5,000-6,000 lb/h) water flow. There is both an economic and resource issue (since high quality water is itself a scarce resource) with increased use of treated water. Second, the higher water injection rates will cause increased combustion dynamics and thermal stresses, thereby negatively impacting hardware life resulting additional maintenance. Third, the addition of excessive amounts of water in the combustor, especially at part loads will result in higher CO and UHC emissions. Very high rates of water injection act to quench the flame and interferes with the burning process resulting in additional concentrations of non-complete products of combustion (I.E. CO and UHC). Fourth, the overall machine efficiency is decreased by the additional amount of water injection. Heat rate (measured in Btu/kWh) is increased (thereby decreasing unit thermal efficiency) on the order of 40-60 Btu/kWh when water levels are increased by the magnitude noted above. This additional heat rate penalty will directly translate into an economic penalty to the turbine owners, since fuel usage will be increased.

While it is not GE's position to dictate machine permit levels, as a responsible manufacturer we feel it is only fair to inform our customers and appropriate regulatory agencies of the consequences of operating our equipment under various conditions. Hopefully by presenting this information both Gainesville Regional Utilities and the regulatory authorities can make an informed, intelligent decision on the appropriate emissions level for this project.

Michael A. Davi, Senior Program Manager
GT Applications Engineering
md/

References:

1. Gerhold, BW, et. al., "Two Stage Combustion of Plain and N-Doped Oil", 17th Symposium (International) on Combustion, The Combustion Institute, 1979.

2. Wilkes, Colin and Russell, RC, "The Effects of Fuel-Bound Nitrogen Concentration and Water Injection on NOx Emissions from a 75 MW Gas Turbine", ASME 78-GT-89, 1978.

Request for Price Quotations
No. 2 Diesel Fuel

Gainesville Regional Utilities (GRU) is requesting price quotations for No. 2 Diesel fuel for its power plants based on the specifications listed below. Please fax your quote to Karen Alford, Utility Analyst, (904)334-2818 (or 334-2786) by September 8, 1994, 4:00 p.m. If you are unable to submit a quotation and would like to remain on GRU's bid list, please notify GRU via fax by the deadline stated. For additional information, please contact Karen Alford at (904)334-3400, ext.1730.

Quantity:	Approximately 100,000 gallons	
Delivery Location:	Gainesville, Florida (Deerhaven, Hague FL)	
Unloading Facilities:	24 hours/day, 7 days/week (Must provide unloading pump.)	
Specifications:	BTU/gal	137,000 min.
	Sulfur by weight	**0.05% max.**
	Bottom Sediment/water	0.1% max.
	Ash by weight	0.05% max.
	Viscosity (100°F)	1.8-4.8 Centistrokes
	Vanadium	200 PPM
	Fuel Bound Nitrogen[1]	**0.015% max. [1]**

[1] Please submit two price quotes:
Quote A - Include guaranteed Fuel Bound Nitrogen less than .015%
Quote B - No specified or guaranteed Fuel Bound Nitrogen content.

Terms and Conditions:	Price quotations should include all applicable taxes. Prices to be quoted F.O.B. Gainesville, Florida Please include payment terms.
Submission Deadline:	Thursday, September 8, 1994 , 4:00 p.m. EST

METALLGESELLSCHAFT CORP.
520 Madison Avenue
New York, N.Y. 10022
Telephone: (212) 715-5200

September 8,1994

GAINESVILLE REG. UTILITIES
ATTENTION: KAREN ALFORD
FAX:904-334-2818

RE: NO BID FOR FUEL

Dear Administrator:

Thank you for considering MG REFINING & MARKETING, INC. for the above referenced solicitation. However, we will not be bidding on these requirements at this time.

Again, thank you for the opportunity. Please keep us on your bidders list for future solicitations for heating fuels and transportations fuels.

Sincerely,

Dawn Kretchmer
MG Refining & Marketing

/FAX +

BP Oil Company
9040 Roswell Rd, Suite 520
Atlanta, GA 30350-1199

Phone: 1-800-544-3210 / Fax: 404 641-2559

ATTN: MS KAREN ALFORD
GAINESVILLE REGIONAL UTIL
P O BOX 490
GAINESVILLE FL 32602

09/08/94

DEAR KAREN,

The following fuel prices were in effect at your location(s) noted below, effective 11:50 AM on 09/08/94.

DELIVERY LOCATION	CUSTOMER NUMBER	TERM	PROD	FOB PRICE	FREIGHT	DELIV PRICE	FEES/ TAXES	TOTAL PRICE
GAINESVILLE	24446254	JACKSO	DL2	53.000	2.940	55.940	2.421	58.361

* DL2 = Low Sulfur, On Road Use / FO2 or DS2 = Off Road Use, High Sulfur

Market fluctuations can create an opportunity to make pricing adjustments during the course of the day. To receive market updates and your most current pricing information, or to place fuel orders please give me a call on our BP GOLDLINE... 1-800-544-3210 (option 1-6).

Your current payment terms are NET 30 DAYS/DATE OF DELV.

I appreciate the opportunity to serve your fuel purchasing needs.

SINCERELY,

ED GALLO
ACCOUNT EXECUTIVE

Fees\Taxes 2.071 Environmental
0.350 SuperFund
2.421 Total

ATTACHMENT 5

SEP-08-1994 14:25 BP OIL CO - DIR. FUELS SO P.01

BP OIL

BP Oil Company
9040 Roswell Road, Suite 520
Atlanta, Georgia 30350 - 1199
1-800-544-3210
(404) 641-2500

Date: 9/8/94

Time: 1:00

Sent To: Karen Alford At: Gainesville Regional

Fax Number: 904 334 2818
(ocl 2786

Sent From: Ed A. Gallo
Account Executive

At: BP Oil Company
Atlanta, GA

Messages: Karen,

Here is our current price for low sulfur diesel fuel delivered to your Deerhaven location. An analysis will be ran at time of delivery to determine the nitrogen level. Please give me a call if you have any questions

Thanks

Ed

To Reply by Phone: (404) 641-2516 BP Goldline: (800) 544-3210, *Option 6*

To Reply by Fax: (404) 641-2559

mp/fxform.125

BP OIL

BP Oil Company
9040 Roswell Road, Suite 520
Atlanta, Georgia 30350 - 1199
1-800-544-3210
(404) 641-2500

Date: 9\9\94

Time: 12:00

Sent To: Karen Alford At: Gainesville Regional

Fax Number: 904 334 2618
(cc) 2786

Sent From: Ed A. Gallo
Account Executive

At: BP Oil Company
Atlanta, GA

Messages: Karen,

To further clarify, our procedure will be to verify the nitrogen level at the time of potential delivery & we will provide you with a copy of this analysis. We are the main supplier for Walt Disney World (i.e. Reedy Creek) who also requires a similar procedure & specification for nitrogen, & we look forward to providing your organization with the same service.

To Reply by Phone: (404) 641-2516 BP Goldline: (800) 544-3210, *Option 6*

To Reply by Fax: (404) 641-2559

exp/faxform.123

Central Oil Co., Inc.

1001 McCloskey Blvd. Tampa, FL 33605 (813)248-2105 FAX (813)247-3567

Facsimile Cover Sheet

To:	Karen Alford
Company:	Gainesville Regional Utilities
Phone:	(904) 334-3400, ext. 1730
Fax	(904) 334-2818.
From:	Dale A. Roberts
Company:	Central Oil Co., Inc.
Phone:	(813)248-2105
Fax:	(813)247-3567
Date:	September 8, 1994
Pages including this cover page:	1

Comments: Quote "B"
Our Current Price for .05% max Sulfur #2 Fuel Oil is $0.5982 per gallon F.O.B. your Storage. This includes Product, State + Federal Pollution Taxes and Freight.
This Price firm thru business hours of September 9, 1994.
Dale A. Roberts

TOTAL P.01

ATTACHMENT 8

STEUART Petroleum Company

P.O. Box 26306
Jacksonville, Florida
32226-6306
6531 Evergreen Avenue
Jacksonville, Florida
32208
(904) 355-9675
(800) 842-3624
Fax (904) 354-2811

September 8, 1994

Karen Alford
Utility Analyst
Gainesville Regional Utilities

Fax Number: 904-334-~~3400~~2818

Thank you for the opportunity to bid to supply approximately 100,000 gallons of No. 2 diesel fuel. Our bid is as follows:

Quote A: No Bid

Quote B: .5905 delivered

Payment Terms: 10 days from date of delivery

Please let us know how we may be of service to Gainesville Regional Utilities.

Sincerely,

Robert A. Bosman
Marketing Representative

RAB/hc

Coastal
The Energy People

TO: Karen Alford, Utility Analyst
Gainesville Regional Utilities

FAX NO.: 904-334-2818/2786

DATE: September 8, 1994

SUBJECT: GRU'S REQUEST FOR PRICE QUOTATIONS - NO. 2 DIESEL FUEL

FROM: J. R. Sauls, Director Utility Sales

JRS

Quantity: Approximately 100,000 Gallons

Delivery Location: Gainesville, Florida

Quote A Guaranteed Nitrogen	Quote B No Guaranteed Nitrogen
$0.630413/Gallon Delivered	$0.608713/Gallon Delivered

Delivery Window: September 12 - 16, 1994

Payment Terms: Net 30 Days Date of Invoice

Coastal Refining & Marketing, Inc.
A SUBSIDIARY OF THE COASTAL CORPORATION
P.O. BOX 025500 • MIAMI FL 33102-5500 • 305/551-5200

ATTACHMENT 10

NOx Reduction Calculations
Fuel Oil Firing

Conditions: 100% load, ISO, fuel flow=50,380 lbs/hr. Calculations assume 100% conversion of FBN to NOx as NO2.

1. Fuel Cost Differential

Minimum = $0.0217/gal
Average = $0.0352/gal

2. FBN Reduction

0.03% - 0.015% = 0.015%

3. NOx Reduction Associated with FBN Reduction

lbs/hr = (.015/100) (50,380 lbs/hr) (46 lbs NO2/14 lbs N) = 24.83 lbs/hr

tons/yr = (24.83 lbs/hr) (2000 hrs/yr) (1/2000 lbs/ton) = 24.83 tons/yr

4. NOx Reduction Cost ($/ton)

a.) Minimum Fuel Cost Differential

= (50,380 lbs/hr) (1/7.2558 lbs/gal) (2000 hrs/yr) ($0.0217/gal)

= $301,344

$/ton NOx = $301,344/24.83 = $12,136/ton

b.) Average Fuel Cost Differential

= (50,380 lbs/hr) (1/7.2558 lbs/gal) (2000 hrs/yr) ($0.0352 /gal)

= $488,816

$/ton NOx = $488,816/24.83 = $19,867/ton

GAINESVILLE REGIONAL UTILITIES
Strategic Planning

RECEIVED
AUG 12 1994
Bureau of
Air Regulation

VIA OVERNIGHT MAIL

August 11, 1994

Ms. Teresa Herron
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, FL 32399-2400

RE: Gainesville Regional Utilities
Proposed Deerhaven Combustion Turbine No. 3
Draft BACT Determination and Conditions of Certification (PA 74-04)

Dear Ms. Herron:

This letter provides Gainesville Regional Utilities' ("GRU") initial comments on the draft Best Available Control Technology ("BACT") Determination and Conditions of Certification for the proposed Deerhaven Combustion Turbine No. 3 ("DHCT3").

Specific comments are provided on Attachments 1 and 2 and the marked-up copies of the above referenced documents. GRU's major concerns are discussed below and focus primarily on the following issues: a) ISO-correction requirements for NO_x emission limits and b) Fuel-bound ("FBN") nitrogen allowances.

ISO-CORRECTION REQUIREMENTS FOR NO_x EMISSION LIMITS

The Department is proposing a NO_x emission limit based on ISO-corrected measured NO_x emissions for DHCT3 beginning January 1, 1998. GRU questions the Department's rationale for imposing this requirement both from a regulatory and technical perspective.

REGULATORY ISSUES

1) NSPS vs. BACT Requirements

GRU's concerns over the Department's proposed permit condition to correct the BACT-based NO_x emission limit to ISO conditions is founded on the basis of its BACT determination.

(904) 334-3400 ext. 1261 P.O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (904) 334-3151

As the Department is aware the New Source Performance Standards ("NSPS") for combustion turbines require compliance with the NSPS limit for NO_x to be demonstrated at ISO conditions (40 CFR 60 Subpart GG). The demonstration is based on the ambient conditions during testing and the appropriate equations set forth in 40 CFR 60.335. The NSPS limit for NO_x was established in September of 1979 and represented a "national standard". Development of this "national standard" included input from the various combustion turbine manufacturers. These manufacturers were aware throughout the development, proposal and eventual promulgation of the NSPS that they would be required to develop combustion turbines which could meet the NSPS limit when corrected to ISO conditions.

The BACT process, however, involves case-by-case determinations based on available and demonstrated technologies, environmental considerations and economics. In most cases current BACT determinations, which have been reported nationally through the U.S. Environmental Protection Agency's ("EPA") BACT/LAER Clearinghouse, are not requiring ISO-corrections. GRU's BACT evaluation, which followed standard EPA procedures and guidance, resulted in proposed BACT emission limits for this project of 15 and 54 ppmvd, corrected to 15% oxygen, when firing natural gas and fuel oil, respectively. GRU's assumption that the Department would establish emission limits based on non ISO-corrected conditions was based on past BACT determinations and the recent EPA Alternative Control Techniques Document - NO_x Emissions from Stationary Gas Turbines, both of which do not specify ISO-correction. Under this assumption GRU approached the various combustion turbine manufacturers and requested availability of and associated guarantees for combustion turbines capable of meeting these emission limitations and GRU's power demands. GRU's request did not address correction of the exhaust gas concentrations for the proposed emission limits to ISO conditions since the basis of the emission limitations (i.e., BACT/LAER Clearinghouse) were not ISO-corrected. Consequently, General Electric ("GE") is unable to provide guarantees for ISO-corrected NO_x emissions.

Because GRU's has based its proposed BACT emission limits on non ISO conditions, it is appropriate for the Department to issue BACT limits based on these same conditions. The Department's intent to change the basis for computing BACT emission limits, while holding the exhaust gas concentrations at the requested levels, represents questionable engineering judgment.

2) Reduction of BACT-based limits

The effects of ISO-correction on BACT-determined emission levels can become significant. Figure 1 illustrates the observed NO_x levels required to meet the Department's proposed limit of 15 ppmvd after ISO-corrections are applied. As illustrated, ISO-correction would require actual emissions to be approximately 20% lower (i.e., less than 12 ppmvd) than GRU's BACT-determined level (i.e., 15 ppmvd not ISO-corrected). These lower levels are

inconsistent with GRU's BACT analysis. This analysis, which considered technical, economical and environmental issues, identified dry low-NO_x ("DLN") combustors and water injection as the commercially available and "demonstrated" technology capable of controlling nitrogen oxide emissions from the proposed combustion turbine. Emission levels associated with these technologies are 15 ppmvd and 42 ppmvd (plus fuel-bound nitrogen allowance) when firing natural gas and fuel oil, respectively, and without applying ISO-corrections. From another perspective, Figure 2 is a representation of how the ISO-corrected concentrations would vary while holding exhaust gas concentrations at GRU's proposed BACT limit of 15 ppmvd (not ISO-corrected). Therefore, if the Department imposes ISO-corrected limits, GRU requests the opportunity to adjust its proposed emission levels for this project accordingly.

A BACT analysis, by its terms, should consider those technologies that are available and have demonstrated the ability to control a particular emission. A BACT determination is established as of the date the permit is issued, based upon those control technologies available in the marketplace or demonstrated by operating experience as capable at that time of achieving the identified BACT emission limits. A BACT analysis is not intended to anticipate control technologies which are not yet commercially demonstrated or which may become available after the permit is issued or after the permitted source becomes operational. To consider unavailable or undemonstrated technologies or emission limits is too speculative and imprecise as to costs and technical feasibility to perform a reliable BACT analysis. At this time, GRU is not aware of any demonstrated or operational dry low NO_x/wet injection control systems now capable or projected to be capable in June 1995 (GRU's in-service date) of continuously achieving NO_x levels less than GRU's proposed non ISO-corrected emission rates of 15 ppmvd and 42 ppmvd, respectively.

Furthermore, GRU has no basis for believing that the proposed combustion turbine will be able to achieve a lower NO_x emission rate in January 1998, merely due to the passage of time. GE has not provided and is unable to provide GRU with any evidence (i.e., commercial performance guarantees) that this combustion turbine will be able to meet a NO_x emission limit less than 15 ppmvd at 15% O_2. The economic costs and other impacts associated with any required modifications of the combustion turbine and combustors to meet a lower limit in the future have not been estimated nor addressed as part of the BACT analysis. GRU is aware of no information which would support setting the NO_x limit at an ISO-corrected level beginning in January 1998. Simple marketing representations of manufacturers' goals for future control technologies and emission limits are not an adequate legal basis for setting BACT limits.

GRU's proposed BACT NO_x emission limits of 15 ppmvd and 42 ppmvd (not ISO-corrected) during natural gas and fuel oil firing, respectively, are consistent with other recent DEP-issued PSD permits for similar gas-fired combustion turbine projects, both in combined cycle and simple cycle applications. These recent permits are for projects with in-service dates of 1994 and 1995, but with the 15 ppmvd limit not applicable until late 1997 or early 1998; until those dates, NO_x emission limits have been typically set at 25 ppmvd non ISO-corrected.

However, GRU is proposing a 15 ppmvd NO_x limit for its combustion turbine as of June 1995, approximately 2.5 years earlier than other units are being required to achieve that emission limit. Thus, for projects with contemporary operational dates, GRU already is proposing NO_x limits for its combustion turbine below those set by DEP for other projects.

TECHNICAL ISSUES

Further adjustments to the NO_x limits resulting from ISO-correction requirements would result in NO_x levels that are not technically achievable by the DLN combustors on a continuous basis. According to GE, these combustors have been designed and developed to produce a fixed exhaust NO_x concentration of 15 ppmvd over a wide range of ambient conditions without regard to ISO-corrections. Application of ISO-corrections to the design NO_x emission levels would result in adjusted NO_x emission limits beyond DLN combustor capability. GRU cannot accept a limit that the manufacturer cannot achieve or guarantee. Furthermore, issuance by the Department of a permit with limits that GRU cannot meet violates the provisions of Chapters 17-4.030 and 17-4.070 F.A.C.

NO_x emissions while firing distillate fuel oil will be controlled by water injection. Technically, it is possible to inject additional water to reduce NO_x emissions below BACT-based limits but, as described in correspondence from General Electric ("GE") dated July 27, 1994 (Attachment 3), there are significant penalties associated with over-injection of water, including efficiency loss, increased water consumption, increased emissions of hydrocarbons and volatile organic compounds, and negative impacts on machine operability and durability. These penalties are not warranted based on the BACT analysis.

FUEL-BOUND NITROGEN ("FBN") ALLOWANCE

The Department has proposed a FBN allowance of up to 6 ppmvd for distillate fuel, conservatively estimated to contain a maximum FBN level of 0.03% by weight. This allowance is not consistent with 40 CFR 60 Subpart GG which would allow up to an additional 12 ppmvd for this same fuel, calculated as follows:

Fuel-Bound Nitrogen (% by weight)	F (NO_x % by volume)
$N \leq 0.015$	0
$0.015 < N \leq 0.1$	0.04(N)

As described in their letter dated July 27, 1994 (Attachment 3), General Electric has relied on this formula and their knowledge of FBN-to-NO_x conversion rates to calculate the 54 ppmvd emission rate guaranteed for DHCT3 during fuel oil combustion. GE's position is consistent with Standards Support and Environmental Impact Statement. Volume 1: Proposed Standards of Performance for Stationary Gas Turbines, PB-272 422, EPA, September 1977

(prepared during the promulgation of 40 CFR Subpart GG) which states that "below a fuel-bound nitrogen level of about 0.05 percent, essentially 100 percent (of organic nitrogen) is converted to NO_x" (see attached Figure 8-4). The Department's FBN formula appears to assume that because the NSPS formula indicates a zero NO_x allowance for fuel with a nitrogen content of 0.015% or less, that there is no FBN present. This is not consistent with EPA's studies which acknowledged that nitrogen is present but not quantifiable at that level. The Subpart GG formula recognizes this and therefore does not subtract out, like the Department does in their calculation, the contribution from the initial 0.015% FBN for fuels with FBN greater than 0.015%.

The BACT analyses for NO_x considers those emissions that can be controlled (e.g., thermal and prompt NO_x). It is GRU's understanding that at this time organic NO_x derived from FBN cannot be controlled other than by burning lower nitrogen-containing fuel. GRU's findings, and the Department's recognition, has been that nitrogen is not a fuel specification. As detailed in GRU's April 20, 1994 correspondence with the Department, few fuel vendors analyze for nitrogen content and could not provide a typical analysis. GRU has recently contacted its fuel vendors again to obtain more current data on nitrogen content in low-sulfur fuel oils. The vendors again indicated that they do not routinely test for nitrogen and had very limited information to provide. Colonial Pipeline indicated that the nitrogen content varies widely and based on their available data is approximately 0.02%. Therefore, in the absence of a reasonable FBN allowance per the Subpart GG formula, the only alternative to control organic NO_x is to overcontrol the BACT-based thermal NO_x levels to comply with the Department's proposed limits. As indicated in GE's July 27, 1994 letter (Attachment 3), controlling NO_x to these levels (i.e., 36 ppmvd) will require additional water injection that will increase the wear and tear on the machine, reduce efficiency and increase HC and VOC emissions by altering the combustion characteristics. If ISO-correction is required actual emissions will have to be even lower. It should be noted that there is a practical limit to the amount of water than can be injected before the combustor flame stability is impaired or the flame is extinguished altogether. Furthermore, injection of water beyond a recommended limit adversely impacts GE's guarantee on the machine.

CONCLUSION

GRU believes it is inappropriate for the Department to require the NSPS derived ISO-correction factor in developing the proposed BACT emission limits and inequitable to unduly limit the NSPS FBN allowance in the manner proposed. If these corrections and factors are to be applied in establishing these BACT limits, the Department is being selective in applying only portions of the NSPS formulas and is unfairly penalizing the DHCT3 project. Specifically, the NSPS allows consideration of combustion turbine efficiency in setting the applicable NSPS limit for NO_x that a unit must meet. The Department's approach fails to make an allowance for such an efficiency factor. All of the NSPS factors should be applied if the Department elects to take such an approach in establishing BACT limits.

Therefore, GRU does not believe the Department's position is reasonable or supportable based upon the available information and requests that:

1) The Department issue BACT limits on a not ISO-corrected basis.

2) ISO-correction of NO_x emissions be applied only during the initial performance tests to demonstrate compliance with the NSPS NO_x emission limit. (In the event the Department requires ISO-correction on a continuous basis, GRU requests that the Department's limit be based on correction of GRU's requested BACT limit to ISO condition using the appropriate equation.)

3) NO_x emissions when burning fuel oil be permitted at 54 ppmvd by providing for the full FBN allowance pursuant to 40 CFR 60 Subpart GG for fuels up to 0.03% nitrogen.

GRU appreciates the opportunity to comment on the draft permit and believes it would be beneficial to further discuss these issues with the Department. I will contact you next week to arrange a meeting at the earliest Department's convenience.

Sincerely,

Yolanta E. Jonynas

Yolanta E. Jonynas
Sr. Electric Utility Environmental Engineer

xc: C. Fancy, FDEP
F. Hancock
R. Casserleigh
D. Beck
D. Fulle
D. Roberts
DHGT3

ATTACHMENT 1

GRU COMMENTS
Best Available Control Technology Demonstration

1) Title - Page 1

Requested Change: Change "Authority" to "Utilities."

Rationale: Name correction.

2) Size of Unit - Page 1, paragraph 1

Requested Change: Specify that the 74 MW is "nominal."

Rationale: Unit output varies under different operating conditions.

3) Requested Operation - Page 1, paragraph 2

Requested Change: Reword as indicated below.

"The applicant has requested to ~~burn natural gas for 1510~~ operate the unit for 3900 hours per year, of which 390 hours may be in the power augmentation mode (PA) and up to a maximum of 2000 hours per year may be while firing distillate fuel oil, with a 0.05 percent sulfur content ~~for a maximum of 2000 hours per year~~. The applicant has indicated the maximum annual tonnage of regulated air pollutants emitted from the ~~facility~~ combustion turbine at 100 percent load, 59^0 F, 60% relative humidity and type of fuel fired to be as follows:"

Rationale: Reflects operations requested by GRU and does not inadvertently limit hours of gas firing.

4) Table - Page 1

Requested Change: a) Add "gas" above "w/PA," b) Revise gas SO2, PM/PM10, CO, H2SO4 emissions, fuel oil NO_x emissions and total emissions as indicated in the table, c) Delete arsenic, and d) Revise regulatory citation from "17-212.400(2)(f)(3)" to "17-212.400(2)(f)(1)."

Rationale: a) Power augmentation is an operating condition while firing natural gas, b) Emission corrections for consistency with Tables 2-1 and 2-5 of the Prevention of Significant Deterioration ("PSD") permit application, c) Arsenic is not a PSD pollutant, and d) Correct citation.

5) NO_x BACT Determination - Page 2

Requested Change: Delete "steam/" on the seventh line.

Rationale: The combustion turbine is equipped with water, not steam, injection for NO_x control.

6) SO2 and H2SO4 BACT Determination - Page 2

Requested Change: Revise as follows: "0.05% sulfur by weight (fuel oil firing), after an equivalent of 55 hours of full load operation at ISO conditions using a fuel oil with a 0.25% sulfur content by weight."

Rationale: GRU requested that DEP allow the existing on-site supply of fuel oil with a 0.25% sulfur content to be used initially until such time as it is drawn down to a minimum practical level. After that the low sulfur (0.05%) fuel oil would be used for the combustion turbine and other existing usages of distillate fuel oil at the Deerhaven Generating Station.

7) BACT Determination Procedure - Page 3, paragraph 2

Requested Change: a) Change "combined cycle power plants" to "simple cycle combustion turbines."

Rationale: The proposed unit is a simple cycle combustion turbine and references to a combined cycle power plant may be a source of confusion.

8) Acid Gases - Nitrogen Oxides, page 3, paragraph 2

Requested Change: Reword the second paragraph by deleting "and water injection" on the second line and changing the last line as follows: "... gas and by water injection to limit emissions to 54 ppmvd..."

Rationale: Clarify that water injection is used to control emissions during fuel oil, not gas, burning.

9) Selective Catalytic Reduction - Page 4, paragraph 1

Requested Change: Revise last sentence as follows:

"As the catalyst ages, the ~~maximum~~ NO_x reduction efficiency (while holding ammonia slip emissions constant) will decrease ~~to approximately 86 percent~~."

Rationale: The ammonia injection rate can be increased to lower NO_x emissions, but the ammonia slip will increase. There is no basis for the generalized percent NO_x reduction.

10) Selective Catalytic Reduction - Page 4, paragraph 4 and 5

Requested Change: a) Change "CTs" to "CT," b) Correct lower range of exhaust temperature from "995" to "955," c) Reword last two sentences of paragraph 4 as follows: "... (reported to operate ~~normally within~~ to a maximum temperature of 1,050°F)."

Rationale: a) Only one unit is proposed, b and c) Consistency with manufacturer's information.

11) Selective Catalytic Reduction - Page 5, paragraph 2

Requested Change: Change on the eighth line "incremented" to "incremental."

Rationale: Grammatical correction.

12) NO_x BACT Determination - Page 5, paragraph 3

Requested Change: Move this paragraph to the section titled BACT Determination by DEP on page 7. GRU requests that the Department explain its basis for stating that a dry low NO_x machine capable of achieving 9 ppm will be available in 1998 or 2.5 years after the combustion turbine's in-service date? How is the availability of a 9 ppm machine with a later in-service date relevant to this unit?

Rationale: The BACT determination discussed on page 5 is the applicant's (GRU's) determination. This paragraph discusses the Department's determination.

13) SO2 and H2SO4 BACT Determination - Page 6, paragraph 1

Requested Change: Delete "(23)."

Rationale: No references are listed.

14) SO2 and H2SO4 BACT Determination - Page 6, paragraph 3

Requested Change: a) Change "Gainesville Utilities" to "Gainesville Regional Utilities," b) Add the following to the last sentence: "...this project, after the equivalent of 55 hours of full load operation at ISO conditions while firing fuel oil with a sulfur content of 0.25% by weight."

Rationale: a) Name correction, b) Allow initially the use of the existing fuel oil supply in the combustion turbine.

15) NO_x Control - Page 7, paragraph 1

Requested Change: a) The cost per ton for controlling NO_x should be changed from "$6,618" to "$6,672.58," b) Delete "at this time" after "BACT" in the last sentence.

Rationale: a) Consistency with page 5 and information provided in GRU's BACT determination, b) See cover letter.

16) NO_x Control - Page 7, paragraph 2

Requested Change: a) The Department should specify the source of its "understanding" of the availability of a 9 ppm machine and the date of such availability, b) Clarify the basis of the statement that 40 CFR 60, Subpart GG "specifies" ISO corrections no later than 1/1/98.

Rationale: a) See cover letter, b) 40 CFR 60 Subpart GG does not require that BACT-based limits be ISO corrected. Corrections are made to demonstrate compliance with the New Source Performance Standards which are considerably higher than the BACT limits.

17) SO2 Control - Page 7

Requested Change: Add the following: "... by weight, after the equivalent of 55 hours of full load operation at ISO conditions while firing fuel oil with a sulfur content of 0.25% by weight."

Rationale: This authorization will permit the consumption of the existing fuel oil supply.

18) BACT Emission Limits - Page 7

Requested Change: Change "Gainesville Utilities" to "Gainesville Regional Utilities".

Rationale: Name correction.

19) NO_x Control - Page 7, paragraph 2

Requested Change: Delete the requirement to correct NO_x emission to ISO conditions as specified in 40 CFR 60, Subpart GG no later than 1/1/98.

Rationale: See cover letter discussion.

20) BACT Emission Limits for NO_x - Page 7, Table

Requested Change: NO_x emissions during oil burning should be changed from "48" to "54" ppmvd and from "190" to "213" lbs/hr as specified in the permit application and GE data sheets.

Rationale: See cover letter.

21) H2SO4 Emission Rate - Page 8

Requested Change: Change the gas emission rate from "2.3" to "2.8" lbs/hr.

Rationale: Typographical error correction for consistency with the PSD Permit application, Table 4-2.

22) Footnote c. - Page 8

Requested Change: Revise as follows: "c. 15 ppmvd/~~48~~54 ppmvd at 15% O2, not ISO corrected. ~~as specified in 40 CFR 60, Subpart GG.~~

Rationale: See cover letter.

23) Footnote d. - Page 8

Requested Change: Adjust, as indicated on the marked-up copy, NO_x levels, NO_x Emissions and the table for calculating the NO_x emission allowance to be consistent with 40 CFR 60 Subpart GG.

24) Footnote f. - Page 9

Requested Change: Add "and sulfates" after "mist."

Rationale: Correction of typographical error.

25) Footnote g. - Page 9

Requested Change: Delete "and sulfates" and add "." after "oil."

Rationale: Correction of typographical error.

26) Power Augmentation - Page 9, paragraph 4

Requested Change: a) Revise the second sentence as follows: "Power augmentation allows the firing of ~~additional fuel~~ natural gas with injection of water into the turbine to produce more megawatts during peak-demand periods." b) Clarify that power augmentation is not a violation of a BACT determination, but a request for a separate BACT determination for a different method of operation.

Rationale: a) Provide a correct description of the power augmentation mode, b) Power augmentation is a different method of operation than either natural gas firing or fuel oil firing. Therefore, a separate BACT determination was requested and is appropriate for this mode. It should not be considered a violation of an established BACT for other operating modes.

ATTACHMENT 2

GRU COMMENTS
Conditions of Certification

1) General Operating Requirements - Condition 1

Requested Change: Insert "(based on high heating values of fuel)" after the word "rates" in the first sentence.

Rationale: Clarification as to basis of heat input rates.

2) General Operating Requirements - Condition 6

Requested Change: Delete.

Rationale: This is a Power Plant Siting Act certified plant. Therefore, no separate operating permit is required.

3) Table I - Allowable Emission Limits

Request: a) Delete columns named "TPY(i) and TPY(j)," b) Revise basis of NO_x limits for oil from "48" to "54" ppmvd and lb/hr from "190" to "213." Change total TPY for oil from "190" to "213" and combined TPY from "240.4" to "263.4", c) Revise SO2 emissions for oil (0.25%) in TPY(c) column from "6.0" to "6.6." Change total from "72.7" to "79.3." d) Change SO2 emissions for gas from "2.3" to "2.8."

Rationale: a) Column is not needed as the 3900 hour and 400 hour restrictions does not apply, b) To allow for FBN NO_x emission allowance consistent with 40 CFR 60 Subpart GG. See comments in cover letter, c and d) Correction of typographical and math errors.

4) Table I - Footnotes

Request: a) Add the following at the end of footnote (b): "Hourly emission rates may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for emission rate correction to other temperatures at different heat input rates shall be provided for DEP review. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to

establish emission rates over a range of temperatures for the purpose of compliance demonstration.", b) Revise footnote (d) as follows: "15 ppmvd/~~48~~54 ppmvd at 15% O2, not ISO corrected ~~as specified in 40 CFR Subpart GG~~, c) In footnote (e) change "48" to "54" ppmvd. Correct NO_x emission levels and formulas for FBN/NO_x allowance and standard as indicated on marked up version, d) Delete footnotes i and j, e) Delete from footnote (c) "with the remaining 1900 hours on natural gas firing."

Rationale: a) Provides for a methodology for determining compliance at non-ISO conditions. See comment in cover letter., b) ISO corrections not appropriate to BACT-based limits. See comment in cover letter., c) See comment in cover letter., d) Footnote is not applicable, d) Not applicable, e) Not necessary.

5) Compliance Determination - Condition 1

Request: a) Change date reference for 40 CFR Appendix A from "July, 1993" to "July 1, 1992," b) Delete references to Methods 1,2 and 3, c) Add frequencies of testing after each method as indicated on marked-up copy, d) Revise frequency of Method 5 to be "I, for fuel oil only. Thereafter, the opacity emissions test may be used unless 10% opacity is exceeded during fuel oil firing." e) Delete requirement for VOC testing and specify that: "Compliance with the total volatile organic compound emission limits will be assumed, provided the allowable CO emission rate is achieved; specific VOC compliance testing is not required."

Rationale: a) Consistency with F.A.C. Chapter 17-297.401, b) Methods are inherent to other required methods, c) Clarification. Initial testing only is recommended for H2SO4, CO, and VOC due to the proposed low emission rates, d) The unit will burn distillate fuel oil with minimal particulate emissions. Based on other utilities' experiences, emissions are so low that each test run must be conducted for an extended time (up to 3 hours) to capture sufficient particulate matter on the filters. Allowing opacity to be used as a surrogate can minimize the time and expense of this testing. e) Again, VOC emissions are typically so low from combustion turbines that emissions testing is not warranted. CO serves as an adequate surrogate.

6) Compliance Determination - Condition 3

Request: a) Revise the first line as follows: "During initial performance tests, to determine compliance with the NSPS standard..."

Rationale: a) See comment in cover letter.

7) Compliance Determination - Condition 4

Request: Delete the requirement to incorporate an annually-determined water/fuel ratio into the permit. Specify that the ratio is to be monitored during fuel oil firing only.

Rationale: As long as NO_x concentrations are maintained at the required levels, there is no need to incorporate into the permit an annually-determined water/fuel ratio. The monitoring requirement should apply only when fuel oil is being fired because that is the only time water will be injected for NO_x control.

8) Compliance Determination - Condition 5

Request: Revise as follows:

"5. Test results will be the average of three valid one-hour runs. The DEP Northeast District office will be notified at least 30 days in writing in advance of the initial performance ~~compliance~~ tests and at least 15 days in advance of the annual compliance test(s). This combustion turbine will operate between ~~95%~~ 90% and 100% of maximum ~~capacity~~ heat input rate for the ambient conditions experienced during the compliance test(s). If it is impracticable to test at 90%-100% of the maximum heat input rate, the combustion turbine may be tested at less than 90% of the maximum heat input rate. In this case, subsequent operation is limited to 110% of the tested heat input rate (corrected for ambient conditions) until a new test is conducted. Once the combustion turbine is so limited, operation at a higher capacity is allowed for no more than 15 days for purposes of additional compliance testing to regain the maximum heat input rate. The turbine manufacturer's heat input rates (based on high heating values of fuel) ~~capacity~~ vs temperature (ambient) curve shall be included with the compliance test results. Compliance tests shall be submitted to the Northeast District office no later than 45 days after completion.

Rationale: Operating/testing flexibility.

9) Compliance Determination - Condition 6

Request: a) Revise the first sentence as follows: "Sulfur and nitrogen content and lower heating value of the fuel oil being fired ... in 40 CFR 60.334(b).," b) Delete the second and third lines, c) Delete the requirement for daily records.

Rationale: a,b,c) The combustion turbine will burn pipeline-supplied natural gas whose composition does not vary significantly. This data will be supplied in support of the annual SO2 compliance demonstration as allowed per Condition 2. Therefore, there is no justification for daily recording of the above referenced parameters. c) With respect to fuel oil, 40 CFR 60.334(b) specifies that for turbines supplied from bulk fuel tanks,

"the values shall be determined on each occasion that fuel is transferred to the storage tank from any other source." Daily records are not required.

10) Compliance Determination - Condition 7

Request: a) Add "fuel switching" as an operating condition that may generate "acceptable" excess emissions. b) Delete requirement for submittal of best operating practices to the Department. If the requirement is not deleted, rewrite the last sentence as follows:

"The document ... days of implementation~~, and shall include time limitations on excess emissions caused by turbine startup~~."

Rationale: a) Temporary excess emissions may occur when fuel switching due to the inherent shift from operating in a pre-mix mode to water injection and vice versa. b) Excess emissions during startup are already limited to two hours per this condition and F.A.C. 17-210.700 (1). b) The unit will be "tweaked" during initial performance tests to optimize emission control across the range of expected loads. Further adjustments will be made specifically on an as-needed basis and will be per manufacturer's recommendations.

11) Notification, Reporting and Recordkeeping - Condition 1.c.

Request: Delete the last sentence regarding "testing of any instruments."

Rationale: The term "instrument" is ambiguous. The continuous emission monitors will be tested as required per 40 CFR Parts 60 and 75 which already contain provisions for DEP notification.

12) Monitoring Requirements - Condition 1

Request: Change "1993" to "1992."

Rationale: Consistency with F.A.C. Chapter 17-297.401.

13) Monitoring Requirements - Condition 2

Request: Delete "/steam" on the second and third lines.

Rationale: Steam injection is not applicable to this combustion turbine.

14) Rule Requirements - Condition 1

Request: Change "July, 1992" to "July 1, 1992."

Rationale: Consistency with F.A.C. Chapter 17-297.401.

15) Rule Requirements - Condition 3

Request: Revise reference from "17-210.300(1)" to "17-210.300."

Rationale: Rule 17-210.300(1) refers to air construction permits. The combustion turbine is being permitted through the PPSA and therefore, no permit other than these Conditions of Certification are required. Rule 17-210.300 references the general requirements for compliance with federal, state, and local regulations and requirements.

16) Rule Requirements - Condition 6

Request: Change "1993" to "1992."

Rationale: Consistency with F.A.C. Chapter 17-297.401.

17) Rule Requirements - Condition 7

Request: Change rule citation from "17-210.300(2)" to "17-210.370(2)."

Rationale: Correction of typographical error.

18) Rule Requirements - Condition 8. and 9

Request: Delete conditions.

Rationale: The combustion turbine is being permitted through the Power Plant Siting Act. Therefore, these conditions are not applicable.

file

GRU

GAINESVILLE REGIONAL UTILITIES

Strategic Planning

April 20, 1994

RECEIVED

APR 25 1994

Bureau of
Air Regulation

Ms. Teresa Heron
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Gainesville Regional Utilities
Deerhaven Combustion Turbine 3 Addition
Fuel-Bound Nitrogen Question

Dear Ms. Heron:

This letter is provided in response to our recent conversation regarding the issue of the fuel-bound nitrogen (FBN) in the fuel oil and the associated emissions of NO_x from the proposed combustion turbine. As you know, the emissions of NO_x from combustion turbines are dependent upon a number of factors including the temperature and pressure at which combustion occurs and at the amount of nitrogen bound up in the fuel. Natural gas, the primary fuel proposed for Deerhaven combustion turbine No. 3, has practically no FBN, and distillate fuel oil, which is proposed as the back-up fuel for the Deerhaven combustion turbine, contains very little FBN. However, there is enough FBN in distillate fuels to make a significant difference in the controlled NO_x emission rate. As a result, the New Source Performance Standard (NSPS) for combustion turbines (40 CFR 60 Subpart GG) provides an allowance for this additional FBN in the NO_x emission standard which is dependent on the actual amount of FBN in the distillate fuel.

GRU's request for a maximum FBN allowance of 0.03% is based on conversations with major oil suppliers including Chevron, Amerada Hess, BP Oil, MG Refining and Marketing, Central Oil, and Coastal Fuels. According to these companies, nitrogen content is not a distillate fuel specification and varies with every shipment of crude oil. There currently is no specific removal/blending process to control the nitrogen content of fuel oils as there is for sulfur. Although there was agreement that the FBN of distillate was expected to be fairly low due to the customary refining process, the companies do not routinely analyze for this parameter. As a result, they had insufficient data to provide a "typical" nitrogen analyses. Spot analyses revealed that the content varies significantly, ranging from less than 0.015% to 0.05% or higher. The companies indicated that while they may be able to provide distillate fuel with a FBN of 0.015% on a batch by batch basis, they cannot and will not guarantee it. The customer, therefore, can either accept or reject what is available at the time an oil purchase is needed.

GRU does not believe it is reasonable nor justifiable to impose a limit on the quality of fuel when that quality may not be available and will not be guaranteed by a supplier. Such a limit could put GRU in the untenable position of having to purchase larger quantities of low-FBN fuel than needed just because it is available at a particular time, or of having to curtail operations or exceed allowable limits in the event the specific fuel is not available when needed.

(904) 334-3400 ext. 1261 P.O. Box 147117, Station A136, Gainesville, Florida 32614-7117 Fax: (904) 334-3151

GRU's request for a FBN allowance of 0.03% is reasonable and supportable. The FBN is within the range indicated by the suppliers to be generally available and provides a needed degree of flexibility in fuel purchases and operations.

As to the question of the emission estimate associated with the FBN of 0.03%, please see the attached letter from GE, the combustion turbine supplier for the proposed project. As indicated, the emission rate estimated by GE for firing fuel oil with a FBN of 0.015% is 42 ppmvd at 15% O_2, which is consistent with other recent applications you have seen. Also as indicated, the emission rate estimated by GE for firing fuel oil with a FBN of 0.03% is 54 ppmvd at 15% O_2 (42 ppmvd + 12 ppmvd, the allowance in Subpart GG for this amount of FBN). While this may be slightly different from values you have seen for other combustion turbine projects recently, it is the estimate from the manufacturer. GE indicates that the differences can be accounted for by actual differences in the combustion turbines (i.e., Frame 7FA versus Frame 7EA, the unit selected by GRU) and differences in the emission estimation techniques used on the different projects.

Based on the information available from the combustion turbine manufacturer, GRU believes that the proposed maximum NO_x emission rate of 54 ppmvd at 15% O_2 is reasonable for distillate fuel oil with a FBN of 0.03%, and is consistent with NSPS.

Please call me at (904) 334-3400 ext. 1284 should you have any questions on this material.

Sincerely,

Yolanta E. Jonynas

Yolanta E. Jonynas
Senior Environmental Engineer

YEJ:gm

Attachments

xc: Hamilton Oven, FDEP
Doug Roberts, HBGS
Doug Fulle, EEC
Tom Putnam, ESI
Doug Beck
DHGT3

GE Power Generation Engineering

Project Engineering
General Electric Company, Bldg. 53, Suite 200
One River Road, Schenectady, NY 12345 USA
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Date: April 13, 1994

Copies:

G Amengual	53-401	MM Schorr	2-647
J Hudson	GVL 156	R Gordon	23-113
J Chalfin	22-237	M Cardano	Tampa
LB/File			

Subject: **Gainesville Regional Utilities - MS7001(EA)**
GR0292

To:
Tom Putman
Ebasco Services
145 Technology Park
Norcross, GA 30092

Per our telecon earlier today, I am writing to explain that our calculation of an additional 12 ppmvd NO_X at a fuel bound nitrogen level of 0.03%, by weight, in distillate fuel is based on the US EPA NSPS allowance in 40CRF60. Therefore the total NO_X level on distillate is 54 ppmvd @ 15% O_2 (42+12). When fuel bound nitrogen levels are 0.015%, by weight, or less, GE has traditionally not increased reported NO_X levels.

Actual fuel bound nitrogen yields on an MS7001(FA) machine should theoretically be slightly lower, due to higher firing temperature and pressure ratios than an (EA) machine. When reporting additional NO_X due to fuel bound nitrogen levels above 0.015% GE has used several methods, one being the above 40CFR60 allowance. In some cases only the difference between the 0.015% level and another specific level (such as 0.03%) was used depending on the frame size machine, combustor, other fuel characteristics etc. These variations may account for different estimated NO_X levels, at a given fuel bound nitrogen level, on different projects. A new algorithm is now being tested which calculates estimated fuel bound nitrogen yields based on a number of technical parameters. Perhaps this will result in more accurate predictions in the future as we develop new data bases with advanced combustors just now becoming operational.

Michael A. Davi

Michael A. Davi, Senior Program Manager
GT Applications Engineering

mad

Florida Department of
Environmental Protection

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

Lawton Chiles
Governor

Virginia B. Wetherell
Secretary

March 28, 1994

Mr. John Bunyak, Chief
Policy, Planning and Permit Review Branch
National Park Service-Air Quality Division
P. O. Box 25287
Denver, CO 80225

Dear Mr. Bunyak:

RE: Gainesville Regional Utilities
Deerhaven Combustion Turbine Addition
Alachua County, PSD-FL-212

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 April 18, 1994. The Bureau's FAX number is (904)922-6979.

If you have any questions, please contact Teresa Heron 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 Protection

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

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Secretary

March 28, 1994

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: Gainesville Regional Utiltiies
Deerhaven Combustion Turbine Addition
Alachua County, PSD-FL-212

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Patricia J. Adams

for C. H. Fancy, P.E.
Chief
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