



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

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

NOV 28 1990

4APT-AEB

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: Vero Beach Municipal Power Plant (PSD-FL-152)
Vero Beach, Florida

Dear Mr. Fancy:

This is to acknowledge receipt of the above referenced facility's application for a prevention of significant deterioration (PSD) construction permit, transmitted by your letter dated October 7, 1990. As discussed between Mr. Barry Andrews of FDER and Ahmed Amanullah of my staff on October 30, 1990, we have the following comments regarding this application.

Vero Beach is proposing to construct a 58 MW combined cycle power plant with its own heat recovery system. This combined cycle power plant is projected to burn natural gas as the primary fuel and No. 2 fuel oil as an alternate fuel.

Our major point of concern is in regards to the BACT determination for NO_x . The applicant proposed wet injection as the control technology for NO_x , rejecting the use of Selective Catalytic Reduction (SCR). The basis for rejection, according to the applicant, was significant adverse energy, economic and environmental impacts.

The major environmental concerns raised by the applicant appear to be the possibility of ammonia slip, the possibility of the formation of SO_3 and ammonium bisulfate, the deactivation of the catalyst due to plugging from sulfur oxides, and the disposal problems related to changing out any vanadium pentoxide catalysts - a hazardous waste under RCRA regulations. What the applicant fails to point out, however, is that there are SCR systems on the market which do not use vanadium pentoxide, or any other metal, as a catalyst. For example, one SCR system makes use of a ceramic molecular sieve to promote the reaction. The ceramic catalyst system has been applied on gas

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turbines and diesel engines. The system does not promote the conversion of SO_2 to SO_3 and has virtually no catalyst poisoning, plugging or masking problems. The ammonia slip is also limited. In addition, the catalyst is not considered a hazardous waste.

The energy impacts described by the applicant are not those which would put a strain on the local energy supply or which appear to be significantly different than typical plant energy usage.

The applicant's argument regarding the adverse effects of SCR usage while firing #2 fuel oil also appears to be unjustified. We have contacted other Regions where similar types of combustion turbines are currently operating with SCR controls. Most of these turbines use natural gas as the primary fuel and No. 2 fuel oil as a backup fuel.

Information from Region I also indicates that a SCR system is continuously being utilized, even while the turbine fires oil.

Also, a feasibility study by the Stationary Source Committee of the Northeast States for Coordinated Air Use Management (NESCAUM) on emission limits for gas turbines (October 1988) revealed that sulfur containing fuels could present somewhat of a problem in promoting the use of SCR in the Northeast. However, information recently obtained from Japan and Europe show that as of April 1986, SCR experience extends back eight and a half years on oil-fired boilers, eight years on gas, and six and a half on coal. Japan currently has at least 22 SCR units for coal-fired boilers, 55 SCR units for oil-fired boilers, and 13 SCR units for liquid natural gas (LNG) boilers. In general, figures show that with coal, SCR catalyst life is 2-3 years; 4-7 years with oil; and with LNG or gas, catalyst life is in excess of 6 years. During the initial installations of SCR units, NO_x reductions averaged 30 percent. With operating experience, more recent installations show reductions in most cases of 70-80%.

In any case, the justifications presented by the applicant for rejecting SCR as a control technology do not appear to be convincing. There are SCR technologies on the market which do not have a hazardous waste by-product. SCR has been applied in the United States on gas and fuel oil fired turbines and diesel engines. It would seem, then, that technical feasibility is not an issue, and, achieving a lower NO_x emission limit than the proposed 42 ppm and 65 ppm for a combined cycle unit is reasonable.

Thank you for the opportunity to review this package before the preliminary determination. If you have any questions regarding these comments, please contact Mr. Ahmed Amanulah of my staff at (404) 347-2904.

Sincerely yours,

Douglas N. Kelley

Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: Shuler W. Massey
Director of Power Resources
Vero Beach Municipal Power Plant
Vero Beach, Florida 32961-1389

B. Andrews
J. Flinn
C. Halladay
C. Collins

Department of Environmental Regulation
Routing and Transmittal Slip

To: (Name, Office, Location)

1. Ms. Jewell A. Hayer, Chief
2. Air Enforcement Branch
3. U.S. EPA, Region IV
4. 345 Courtland St., NE

Remarks: Atlanta, Georgia 30365

PSD-FL-152

From C. H. Faney FL DEB/DARM/BAS	Date 3-28-91
	Phone 904-488-1344

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M

- KATHLEEN BLIZZARD
- RICHARD W. MOORE
- ANGELA R. MORRISON
- MARIBEL N. NICHOLSON
- DIANA M. PARKER
- LAURA BOYD PEARCE
- GARY V. PERKO
- MICHAEL P. PETROVICH
- DAVID L. POWELL
- DOUGLAS S. ROBERTS
- CECELIA C. SMITH
- OF COUNSEL
- W. ROBERT FOKES

consideration in
 please find the
 the City of Vero
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Supporting
 NO_x Control

Selective
 Vero Beach

Attachment "C" -- Comparison of Permitted and
 Projected NO_x Emission Levels from City of Vero
 Beach Municipal Power Plant.

The City hopes that the information provided in these
 attachments will be of assistance to the Department in

State of Florida
Department of Environmental Regulation

District Routing Slip

To: Chuck Collins Date: 3-29-91

CC. To:

	Pensacola	Northwest District	
	Panama City	Northwest District Branch Office	
	Tallahassee	Northwest District Branch Office	
	Apalachicola	Northwest District Satellite Office	
	Tampa	Southwest District	
	Bartow	Southwest District Satellite Office	
	Venice	Southwest District Satellite Office	
<input checked="" type="checkbox"/>	Orlando	Central District	
	Melbourne	Central District Satellite Office	
	Jacksonville	Northeast District	
	Gainesville	Northeast District Branch Office	
	Fort Myers	South District	
	Punta Gorda	South District Branch Office	
	Marathon	South District Branch Office	
	West Palm Beach	Southeast District	
	Port St. Lucie	Southeast District Branch Office	
Reply Optional <input type="checkbox"/>		Reply Required <input type="checkbox"/>	Info Only <input type="checkbox"/>
Date Due _____		Date Due _____	

Comments:

From: C. H. Fanny Tel.: 30/278-1344

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1991

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KATHLEEN BLIZZARD
RICHARD W. MOORE
ANGELA R. MORRISON
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DOUGLAS S. ROBERTS
CECELIA C. SMITH

OF COUNSEL
W. ROBERT FOXES

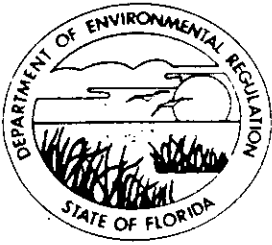
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Florida Department of Environmental Regulation

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

Bob Martinez, Governor

Dale Twachtmann, Secretary

John Shearer, Assistant Secretary

October 2, 1990

Ms. Jewell A. Harper, Chief
Air Enforcement Branch
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Dear Ms. Harper:

Re: Completeness Review

The enclosed information is being forwarded to you for completeness review.

1. Vero Beach Municipal Power Plant: 58 MW combined cycle plant; PSD-FL-152; please submit comments by October 29, 1990;
2. Farmland Industries, Inc. - Green Bay Complex: Sulfuric Acid Plant No. 5 modification; PSD-FL-143A; please submit comments as soon as possible;
3. CF Industries - "C" and "D" Double Absorption Sulfuric Acid Plants modifications; PSD-FL-155; please submit comments by October 25, 1990; and,
4. Anheuser-Busch Companies, Inc. - lid production capacity modification; PSD-FL-153; currently incomplete and their response will be forwarded upon receipt; please review for comments.
5. Ft. Pierce Utilities Authority - H.D. King Unit 9: modification; PSD-FL-154; currently incomplete and their response will be forwarded to you upon receipt; please review for comments.

If there are any questions, please call Barry Andrews at (904) 488-1344 or write to me at the above address. All comments, written or oral, should be received by the above requested dates. If it is convenient to FAX a response to us, the FAX number to use is (904)922-6979.

Sincerely,

C. H. Fancy, P.E.
Chief

Bureau of Air Regulation

CHF/BM/t



BLACK & VEATCH

8400 Ward Parkway, P.O. Box No. 8405, Kansas City, Missouri 64114, (913)339-2000

RECEIVED

OCT 1 1990

City of Vero Beach, Florida
Combustion Turbine - Unit 5
FDER Air Permit

B&V Project 16834
B&V File # 820002
September 25, 1990

Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. C. H. Fancy, Chief
Bureau of Air Regulation

Gentlemen:

This is in response to your letter of September 11, 1990, to Mr. Shuler Massey, Vero Beach Municipal Power Plant, requesting additional information about application AC 31-184928 for a Permit to Construct the above project. Subsequent to your letter, Black & Veatch contacted Ms. Teresa Heron of your staff to clarify the information requested. The answers to the questions are provided in the paragraphs below. A copy of your September 11 letter is also attached for reference.

1. What is the basis for the calculations?

Manufacturer's combustion parameters for the GE Model PG6541(B) Frame 6 combustion turbine have been provided as guarantees by General Electric and are presented in the permit application (final table in the "Vendor Information Applicable to Application to Construct" section). These parameters were the basis for all calculations and modeling inputs. The parameters are based on International Standards Organization (ISO) conditions (59 F, 14.7 psi, and 60 percent relative humidity). The following information should clarify additional questions you have:

<u>Condition</u>	<u>Units</u>	<u>Methane</u>	<u>Distillate</u>
Fuel LHV	Btu/lb	21,515	18,550
	Btu/kWh	11,290	11,430
	kJ/Wh	11.902	12.018
Fuel Bound Nitrogen	percent	N/A	<0.015

The heat recovery steam generator (HRSG) will not have supplementary firing (duct burning). Therefore, no additional emissions will be generated from the HRSG.

Florida Department of Environmental Regulation 2
Mr. C. H. Fancy, Chief

B&V Project 16834
September 25, 1990

2. What is the net emission increase from your facility as a result of this modification?

The net emission increase for the addition of the new combustion turbine is given in Table 3-4 of the permit application. These values represent the total emission increase for the facility. No contemporaneous emission increases have occurred during the past five year period.

Currently, the City of Vero Beach Municipal Power Plant has operating permits for four existing units. Permits for Units 2, 3, and 4 were renewed during 1988 with no changes in operating conditions or emission limitations. The permit for Unit 1 is currently being renewed (expires 12/10/90). No changes in operating conditions or emission limits are proposed or expected.

No new sources or equipment such as fuel oil tanks or diesel engine generators have been added that would potentially add contemporaneous increases to the total facility emissions.

3. Provide a flow diagram identifying emission points for the combined cycle plant.

Process flow and plant site arrangement drawings were included in the permit application (Figures 2 and 3 in the "Drawings and Figures Applicable to the Application to Construct" section). These figures clearly show the fuel and combustion gas flows applicable to the turbine addition. One item excluded in the process flow diagram was the bypass option for the HRSG. The bypass option is now shown in the diagram.

In the discussions with Ms. Teresa Heron, Mr. Mike Pelan (B&V) verified that the exhaust gases from the new combustion turbine installation is independent of any of the existing exhaust stacks. A revised process flow diagram is provided to supplement the application.

4. Submit a completed page 1 of 12 of DER Form 17-1.202(1).

Discussions with Ms. Heron indicated that page 1 of 12 of DER Form 17-1.202(1) required resubmission because the document was not signed and dated. While the City's records indicate that this form was completed, a new page 1 is included for your files.

5. Consideration of Diesel Starter

One additional item has arisen subsequent to the submittal of the permit application. As is evident from the attached process flow diagram, a diesel starter will be used for periods of initial turbine startup. The diesel starter is shown in the revised process flow diagram.

Florida Department of Environmental Regulation 3
Mr. C. H. Fancy, Chief

B&V Project 16834
September 25, 1990

The diesel starting motor will be a Detroit diesel engine rated 630 horsepower at 2300 rpm. The engine will operate approximately 15 minutes during the startup sequence and an automatic clutch will disengage the engine when the turbine has reached self-sustaining speed.

The diesel starter and the turbine will not run concurrently. Further, the emissions from the starter are significantly less than those generated by the turbine operating under a base load condition. Therefore, the analysis performed for the air quality impacts continues to represent a worst case situation.

If you have any further questions, please let us know.

Very truly yours,

BLACK & VEATCH



L. W. Sherrill

AFH:rs
Attachments

cc: Shuler Massey, City of Vero Beach, Florida

BA/CHF

Teresa Heron

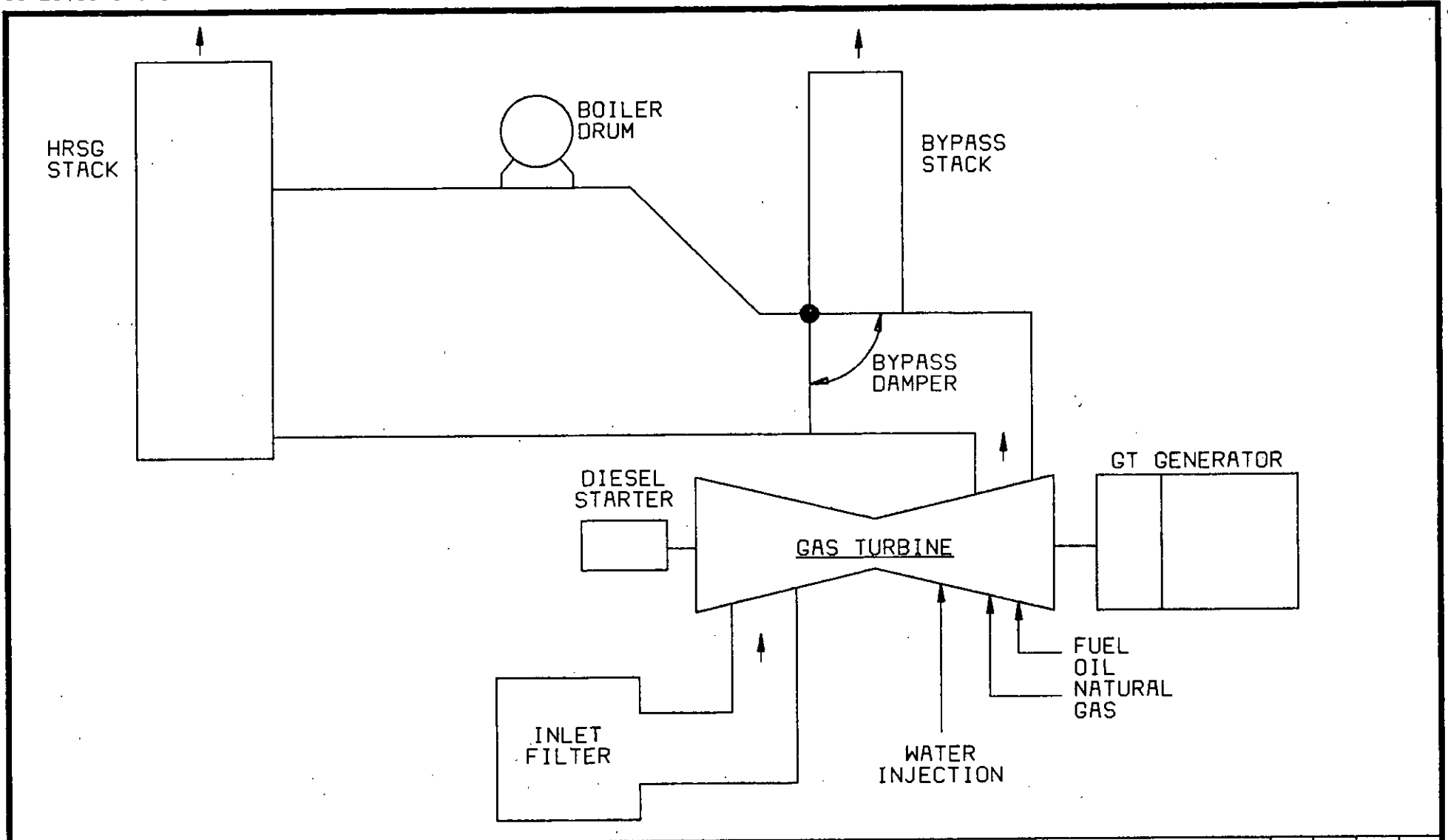
Chuck Collins, Cent. Dist.

Jewell A. Harger, EPA

Cleve Holladay

Bary Andrews

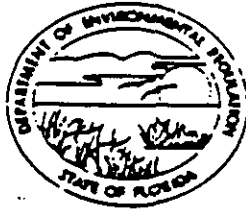
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NO		DATE		REVISIONS AND RECORD OF ISSUE				BY	CHK	APP	FLM

BLACK & VEATCH		CITY OF VERO BEACH FLORIDA COMBUSTION TURBINE UNIT 5				PROJECT		DRAWING NUMBER		REV
						16835-SK-091790-01		16835-SK-091790-01		
ENGINEER	DRAWN	COMBINED CYCLE MAIN PROCESS FLOW DIAGRAM				CODE				
CHECKED	DATE					AREA				

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION



BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Combustion Turbine (CT) New¹ Existing¹

APPLICATION TYPE: Construction Operation Modification

COMPANY NAME: The City of Vero Beach, Florida COUNTY: Indian River

Identify the specific emission point source(s) addressed in this application (i.e. Lime
Kila No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) CT, Gas/Distillate Fired

SOURCE LOCATION: ~~Street~~ Vero Beach Municipal Power Plant City Vero Beach

UTM: East 561.385 km North 3056.538 km

Latitude 27° 37' 59" N Longitude 80° 22' 41" W

APPLICANT NAME AND TITLE: _____

APPLICANT ADDRESS: _____

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of the City of Vero Beach

I certify that the statements made in this application for a construction permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Shuler W. Massey

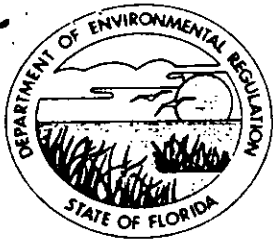
Shuler W. Massey, Director of Power Resources
Name and Title (Please Type)

Date: 9-28-90 Telephone No. 407-562-7231

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

¹ See Florida Administrative Code Rule 17-2.100(57) and (104)



Florida Department of Environmental Regulation

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

Bob Martinez, Governor

Dale Twachtmann, Secretary

John Shearer, Assistant Secretary

September 11, 1990

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Shuler W. Massey
Director of Power Resources
Vero Beach Municipal Power Plant
Vero Beach, Florida 32961-1389

Dear Mr. Massey:

Re: AC 31-184928 and PSD-FL-152
58 MW Combined Cycle Plant

The Department has received your application for a permit to construct a 58 MW combined cycle plant at the Vero Beach Municipal Power Plant in the city of Vero Beach, Indian River County, Florida. We need more information to process this application. Please complete the application by supplying the information requested below:

Please submit basis of calculations used as follows:

- Manufacturer's heat input rate at manufacturer's rated load (kilojoules/watt-hr).
- Allowance for fuel-bound nitrogen.
- What is the heat input (LHV supplemental heat) to the HRSC?

What is the net emission increase for your facility as a result of this modification? As per F.A.C. Rule 17-2.500(2)(3), any emission increase at your facility during a 5 year period will be considered a contemporaneous emissions increase and it will be counted towards the net significance level increase.

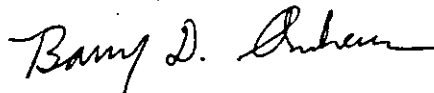
Provide a flow diagram identifying the emission points for the combined cycle plant. Are these single emission points or will they share the stack with one or more existing sources? Please explain.

Submit a completed page 1 of 12 of DER Form 17-1.202(1).

Mr. Shuler W. Massey
September 11, 1990
Page 2

If you have any questions on the data requested, please call
Teresa M. Heron at (904)488-1344 or write to me at the above
address.

Sincerely,



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

CHF/TH/plm

c: Chuck Collins
Lloyd Wade Sherrill, P.E. ✓

HASSEE

SENDER: Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional services requested.

1. Show to whom delivered, date, and addressee's address. (Extra charge) 2. Restricted Delivery (Extra charge)

<p>3. Article Addressed to:</p> <p>Mr. Shuler W. Massey Director of Power Resources Vero Beach Municipal Power Plant P. O. Box 1389 Vero Beach, Florida 32961-1389</p>	<p>4. Article Number</p> <p>P 256 396 189</p> <p>Type of Service:</p> <p><input type="checkbox"/> Registered <input type="checkbox"/> Insured <input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD <input type="checkbox"/> Express Mail <input type="checkbox"/> Return Receipt for Merchandise</p> <p>Always obtain signature of addressee or agent and DATE DELIVERED.</p>
<p>5. Signature - Address</p> <p>X</p>	<p>8. Addressee's Address (ONLY if requested and fee paid)</p>
<p>6. Signature - Agent</p> <p>X </p>	
<p>7. Date of Delivery</p> <p>9/13/90</p>	

PS Form 3811, Mar. 1988 * U.S.G.P.O. 1988-212-865 DOMESTIC RETURN RECEIPT

P 256 396 189

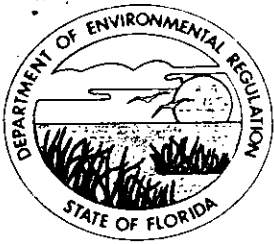
RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

U.S.G.P.O. 1989-234-555

Sent to	
Mr. Shuler W. Massey, City of: Vero Beach	
Street and No. P. O. Box 1389	
P. O. State and ZIP Code Vero Beach, FL 32961-1389	
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	\$
Postmark or Date	
Mailed: 9-11-90	
Permit: AC 31-184928	
PSD-FL-152	

PS Form 3800, June 1985



Florida Department of Environmental Regulation

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

Bob Martinez, Governor

Dale Twachtmann, Secretary

John Shearer, Assistant Secretary

September 11, 1990

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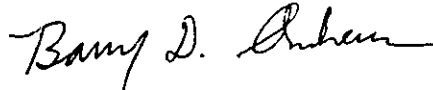
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Mr. Shuler W. Massey
September 11, 1990
Page 2

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

CHF/TH/plm

c: Chuck Collins
Lloyd Wade Sherrill, P.E.
Quell Harper, EPA