CITY OF VERO BEACH, FLORIDA
MUNICIPAL ELECTRIC SYSTEM

PROJECT 16834

APPLICATION TO CONSTRUCT AN
AIR POLLUTION SOURCE

FILE 16834.32.0401

JULY 1990

Black & Veatch
Engineers-Architects

APPLICATION TO CONSTRUCT AN AIR POLLUTION SOURCE - FORMS

$5000 pd.
8-13-90
Recpt. #151153

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

AC31-184928
PSD-FL-152

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Combustion Turbine (CT) [X] New[1] [ ] Existing[1]

APPLICATION TYPE: [XX] 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 Kiln 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, Director of Power Resources
Name and Title (Please Type)

Date: ______ 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)

DER Form 17-1.202(1)
Effective October 31, 1982

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed *Lloyd Wade Sherrill*

Lloyd Wade Sherrill
Name (Please Type)

Black & Veatch Engineers-Architects
Company Name (Please Type)

11401 Lamar
Mailing Address (Please Type)

Florida Registration No. *29138* Date: *July 24, 1990* Telephone No. 913-339-7244

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

See Sections 2.0 and 6.0 of the AAQIA. The project will result in full compliance with all applicable regulations.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction January 1991 Completion of Construction December 1991

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

See Section 6.0 of the AAQIA.

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

E. Requested permitted equipment operating time: hrs/day 24 ; days/wk 7 ; wks/yr 52

if power plant, hrs/yr 8760; if seasonal, describe: NA

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? No

a. If yes, has "offset" been applied?

b. If yes, has "Lowest Achievable Emission Rate" been applied?

c. If yes, list non-attainment pollutants.

2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. Yes

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. Yes

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? Yes

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

a. If yes, for what pollutants? NA

b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants Type	Contaminants % Wt	Utilization Rate - lbs/hr	Relate to Flow Diagram
NA				

B. Process Rate, if applicable: (See Section V, Item 1) NA

1. Total Process Input Rate (lbs/hr): ______

2. Product Weight (lbs/hr): ______

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1] Maximum lbs/hr	Emission[1] Actual T/yr	Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission lbs/yr	Potential[4] Emission T/yr	Relate to Flow Diagram
See Section 3.3 of th AAQIA.							

[1]See Section V, Item 2.

[2]Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3]Calculated from operating rate and applicable standard.

[4]Emission, if source operated without control (See Section V, Item 3).

Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
See Sections 3.3 and 6.0 of the AAQIA.				

Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
Natural Gas		0.49 MMCF/h	446.0
or			
No. 2 Fuel Oil		3,390 gal/h	443.3

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: Gas: 2,000 gr/MMCF Oil: 0.25% by wgt. Percent Ash: Nil (both fuels)

Density: Gas: 1 lb/23.8 CF Oil: 7.05 lb/gal lbs/gal Typical Percent Nitrogen: <0.015%

Heat Capacity: Gas: 21,515 Oil: 18,550 BTU/lb Gas: 904 Btu/CF Oil: 130,800 Btu/gal BTU/gal

Other Fuel Contaminants (which may cause air pollution): Negl.

If applicable, indicate the percent of fuel used for space heating.

Annual Average None Maximum None

Indicate liquid or solid wastes generated and method of disposal.

NA

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: See Table 3-2 in the AAQIA ft. Stack Diameter: ______ ft.

Gas Flow Rate: ______ ACFM ______ DSCFM Gas Exit Temperature: ______ °F.

Water Vapor Content: ______ % Velocity: ______ FPS

SECTION IV: INCINERATOR INFORMATION

NA

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Patholog-ical)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Inciner-ated							
Uncon-trolled (lbs/hr)							

Description of Waste ______

Total Weight Incinerated (lbs/hr) ______ Design Capacity (lbs/hr) ______

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

Manufacturer ______

Date Constructed ______ Model No. ______

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel Type	Fuel BTU/hr	Temperature (°F)
Primary Chamber					
Secondary Chamber					

Stack Height: ______ ft. Stack Diamter: ______ Stack Temp. ______

Gas Flow Rate: ______ ACFM ______ DSCFM* Velocity: ______ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: [ ] Cyclone [ ] Wet Scrubber [ ] Afterburner

[ ] Other (specify) ______

Brief description of operating characteristics of control devices: ______

______

______

______

______

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

______

______

______

______

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.) See Section 6.0 of the AAQIA.

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency). See Section 6.0 of the AAQIA.

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained. See Figure 3 in the AAQIA.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map). See Figure 1 in the AAQIA.

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram. See Figure 2 in the AAQIA.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

[X] Yes [ ] No Subpart GG

Contaminant	Rate or Concentration
SO_2	150 ppmvd at 15% O_2
NO_x	75 ppmvd at 15% O_2
SO_2 and NO_x	Periodic fuel sampling for S and N content
NO_x	CEM for fuel consumption and water/fuel ratio

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [X] No Case by case determination.

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration
See Section 6.0 of the AAQIA.	

D. Describe the existing control and treatment technology (if any). NA

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1. See Section 6.0 of the AAQIA.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

[1] Explain method of determining efficiency.
[2] Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Costs:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

Describe the control technology selected: See Section 6.0 of the AAQIA.

1. Control Device: 2. Efficiency:[1]

3. Capital Cost: 4. Useful Life:

5. Operating Cost: 6. Energy:[2]

7. Maintenance Cost: 8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

xplain method of determining efficiency.
nergy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1]Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data See Section 5.2 of the AAQIA.

1. ______ no. sites ______ TSP ______ ( ) SO^2* ______ Wind spd/dir

Period of Monitoring ___/___/___ to ___/___/___
month day year month day year

Other data recorded ______

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? [ ] Yes [ ] No

b. Was instrumentation calibrated in accordance with Department procedures?

[ ] Yes [ ] No [ ] Unknown

. Meteorological Data Used for Air Quality Modeling See Section 4.3 of the AAQIA.

1. _____ Year(s) of data from ______________ to ______________
month day year month day year

2. Surface data obtained from (location)______________________________

3. Upper air (mixing height) data obtained from (location)______________________________

4. Stability wind rose (STAR) data obtained from (location)______________________________

Computer Models Used See Section 4.1 of the AAQIA.

1. ______________________________ Modified? If yes, attach description.

2. ______________________________ Modified? If yes, attach description.

3. ______________________________ Modified? If yes, attach description.

4. ______________________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

Applicants Maximum Allowable Emission Data See Section 3.3 of the AAQIA.

Pollutant	Emission Rate	
TSP	______________________________	grams/sec
SO^2	______________________________	grams/sec

Emission Data Used in Modeling*

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

Attach all other information supportive to the PSD review.*

Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.*

Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.*

*E-H: See AAQIA for details.

VENDOR INFORMATION APPLICABLE TO APPLICATION TO CONSTRUCT

GE Industry
Sales & Services

February 26, 1990

Most Current

SUBJECT: CITY OF VERO BEACH, FLORIDA
ESTIMATING DATA

Black & Veatch
Engineers-Architects
P. O. Box 8405
Kansas City, MO 64114

Attn: Mr. L. W. Sherrill

Gentlemen:

Thank you for recent discussions with you and your Mr. Dave Frieze concerning the repowering project at Vero Beach. Your contract with Vero Beach has progressed quite nicely and your schedule for the repowering project is somewhat aggressive.

During our most recent meeting, you inquired about NOx emissions from the GE PG-6541B, "Frame 6" gas turbine. The current Frame 6 arrangements and respective NOx emissions have been compiled onto a single page which is attached for your review. You may recall discussion about NOx levels as low as 25 ppm while burning natural gas fuel. However, the two units which have been sold with 25 ppm NOx emissions on natural gas have utilized massive steam injection, whereas you have indicated that the Vero Beach unit will utilize water injection.

As shown on the attached page, if required, massive water injection can be utilized in the GE Frame 6 to achieve NOx levels of 42 ppm while burning either methane or distillate oil fuel. However, it should be recognized that massive diluent injection may have detrimental effects on the unit maintenance and will greatly reduce the recommended interval between combustion inspections.

The Dry Low NOx combustion arrangement for the Frame 6 is currently being offered for shipments occurring in the fourth quarter of 1991. In the event that the Dry Low NOx combustion alternative is attractive to Vero Beach, early discussions would be encouraged to determine the project delivery requirements and the possibility of expediting the introduction of this new combustion system.

Enclosed are eight (8) pages of estimated performance for the GE PG-6541B gas turbine. The first two pages contain data requested by Mr. Dave Frieze during our recent meeting. These first two pages represent the GE recommendation for best available control technology in your repowering project. The ambient conditions and inlet and exhaust pressure losses indicated on the first two pages are as you requested.

Previous performance estimates were calculated and dated 1/18/90, but had not been formally submitted to you. The previous estimates are enclosed and represent ISO conditions and the effects of operation with an 85% effectiveness evaporative cooler. When reviewing the data pages dated 1/18/90, please note that the site elevation and exhaust pressure loss are slightly different from the most recent request for performance estimates.

As you review the enclosed information, and as you finalize your gas turbine specifications, please let me know what additional questions you may have about GE turbine equipment. Your project requirements of electric output, steam production, and timing seem ideal for an application of the GE Frame 6 gas turbine.

Best regards,

M. D. Morris
Account Manager
Power Generation Equipment

cc: Mr. D. L. Frieze, B&V

MDM2261
encls.

PG-6541B ESTIMATED ISO PERFORMANCE
CURRENT LOWEST AVAILABLE NOx EMISSIONS

	Fuel	Output	Heat Rate Btu/kWh	Water Injection	NOx
NSPS	Methane	38,830 kW	10,940 LHV	4,700#/hr	95 ppm
	Distillate	38,690	11,180	11,510	94
BACT	Methane	40,010	11,140	16,020	42
	Distillate	39,290	11,280	17,410	65
Massive Inject.	Methane	40,010	11,140	16,020	42
	Distillate	40,360	11,460	28,070	42
Dry Low NO_x	Methane	38,180	10,890	0	25
	Distillate	37,360	11,000	0	165
	Distillate	38,370	11,180	10,010	65

Massive Injection will greatly reduce the recommended intervals between Combustion Inspections.

NOx stated is ppmvd at 15% O_2 and is without any correction for heat rate.

Distillate fuel contains less than 0.015% Fuel Bound Nitrogen.

M. D. Morris
February 23, 1990

Vero Beach Combustion Turbine - Combustion Parameters
GE Model PG6541(B) Frame 6

Site Conditions	Natural Gas	No. 2 Fuel Oil
Ambient Temperature (F)	59	59
Relative Humidity (%)	60	60
Site Pressure (in H2O)	14.7	14.7
Elevation (ft)	0	0
Performance Conditions		
Gross Output - CT (MW)	39.5	38.9
Gross Output - ST (MW)*	18.5	18.4
Total Gross Output (MW)	58.0	57.3
Fuel Burn Rate, LHV (MBtu/h)	446.0	443.3
Exhaust Flow (lb/h)	1,121,000	1,125,000
Exhaust Temp. (F) - Combined Cycle	290	290
Exhaust Temp. (F) - Simple Cycle	1,003	1,003
Exhaust Molecular Weight (lb/lb-mole)	28.187	28.515
Site Pressure (psia)	14.7	14.7
Fuel LHV (Btu/lb)	21,515	18,550
Gas Constant (ft-lb/lb-mole R)	1,545	1,545
Combined Cycle		
Exhaust Flow (acfm)	362,840	359,946
Exhaust Velocity (fpm)	5,456	5,413
Stack Cross sectional area (sq-ft)	66.5	66.5
Stack Diameter (ft)	9.2	9.2
Simple Cycle		
Exhaust Flow (acfm)	707,780	702,135
Exhaust Velocity (fpm)	5,499	5,456
Stack Cross sectional area (sq-ft)	128.7	128.7
Stack Diameter (ft)	12.8	12.8
Exhaust Analysis % Volume		
Argon	0.88	0.88
Nitrogen	73.61	73.05
Oxygen	13.16	13.10
Carbon Dioxide	4.30	3.28
Water	8.05	9.70
Emissions		
SO2 (lb/h)	0.1	119.5
NO2 (@ 15% O2) (lb/h)	75.0	121.0
CO (lb/h)	10.0	10.0
UHC (lb/h)	4.0	4.0
Particulate (lb/h)	2.5	10.0

AMBIENT AIR QUALITY IMPACT ANALYSIS

CITY OF VERO BEACH, FLORIDA
MUNICIPAL ELECTRIC SYSTEM

AMBIENT AIR QUALITY IMPACT ANALYSIS IN SUPPORT OF A PERMIT TO CONSTRUCT APPLICATION

FILE 16834.32.0401

JULY 1990

Black & Veatch
Engineers-Architects

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1.0 INTRODUCTION

The City of Vero Beach, Florida Municipal Electric System proposes to construct and operate a new combustion turbine generator. The unit will be located at the existing Vero Beach Municipal Power Plant in the city of Vero Beach, Indian River County, Florida. The new generator system will consist of a single nominal 40 megawatt (MW) combustion turbine (CT) and a single heat recovery steam generator (HRSG) which will be used to repower an existing nominal 20 MW steam turbine.

This report describes the ambient air quality impact analysis (AAQIA) performed in support of a Florida Department of Environmental Regulation (FDER) permit to construct an air pollution source for the Plant. The purpose of the AAQIA is to demonstrate that the CT installation will not cause or contribute to an exceedance of any National or State Ambient Air Quality Standards (AAQSs) and will not consume more than the applicable amount of Prevention of Significant Deterioration (PSD) air quality Class II increment. A Workplan which described the proposed methodology to be followed in this AAQIA was submitted to and conditionally approved by the appropriate FDER staff. The Workplan submittal and FDER approval letters are included in an attached correspondence section of the PSD application.

2.0 PROJECT DESCRIPTION

The Vero Beach Municipal Power Plant is located in the southeast section of the City of Vero Beach, Florida. The site is bounded on the east by the Indian River, on the north by residential housing, on the south by a municipal wastewater treatment plant, and on the west by undeveloped land. Figure 1 shows the location of the existing plant in relation to the surrounding area.

The Vero Beach Municipal Power Plant currently operates four natural gas and fuel oil fired steam turbine units, totaling 117 MW of electric power. In addition, three diesel powered turbines are available at another location approximately one mile from the power plant, and are capable of generating an additional 10.7 MW of electrical power.

The proposed CT addition and existing power plant site arrangement are depicted in Figure 2. Facilities at the plant site currently include the building housing the four existing steam turbine units, three fuel oil storage tanks, an electrical substation, and ancilliary facilities. The addition will include a CT and a HRSG. Figure 3 displays a flow diagram showing the material and gas flows for the CT addition.

When operating in the combined cycle mode, the CT will exhaust combustion gases to a dedicated HRSG and eventually to the 125-foot high HRSG stack. Steam from the HRSG will be used to repower the existing Unit 2 steam turbine generator. During periods of HRSG maintenance, the CT will operate in a simple cycle mode and exhaust to an 80 foot-high bypass stack.

The air permit application will be based on a conceptual design which includes a single GE Model PG6541(B) (Frame 6) CT. Natural gas will be the primary fuel for the project. No. 2 fuel oil will be the backup fuel.

3.0 SOURCE CHARACTERIZATION

This section discusses the applicability of federal, state and local air quality regulations, good engineering practice (GEP) stack height determination, stack parameters and building downwash, source emission rates, and the current air quality status at the Vero Beach site. Current best engineering estimates and the projections of the final design were used to establish the modeling parameters.

3.1 APPLICABILITY OF REGULATIONS

The proposed Vero Beach CT project is subject to PSD regulations because the installation of the CT constitutes a major modification to an existing major stationary source and the plant is located in an area designated as "attainment" for all applicable pollutants. In addition, the requirements of the Florida Air Pollution and Permit Rules and Regulations and New Source Performance Standards (NSPS) Subpart GG are applicable.

3.2 GEP STACK HEIGHT DETERMINATION

A GEP stack height analysis was conducted for the existing and proposed buildings and structures at the Municipal Power Plant. Pollutant dispersion from stacks built to the maximum GEP height will not be influenced by surrounding building turbulence. If stacks are built lower than GEP, special air quality modeling techniques such as downwash and cavity analysis are required to demonstrate compliance with air quality standards.

EPA's Guideline For Determination of Good Engineering Practice Stack Height (1985) was used as a basis for this GEP analysis. The dominant structure influencing the proposed CT stack is the existing Units 1-4 turbine generator building. The maximum height of the generation building is 60 feet above grade. The minimum and maximum width of the generation building is 140 feet and 235 feet, respectively. Because the maximum projected width is greater than the maximum building height, the formula for calculating the GEP stack height is simplified to two and one-half times the maximum building height (2.5 x height). Therefore, the maximum GEP height is calculated to be 150 feet. A computer program named

"BRZWAKE" was used to calculate the direction specific downwash parameters. The program evaluates building and stack dimensions and calculates a maximum projected width, a GEP stack height, and designates which downwash algorithm is applicable, for each 10 degree radial direction. Table 3-1 summarizes the results of calculations for each of the 36 directional radials used in the modeling analysis.

3.3 STACK PARAMETERS AND SOURCE EMISSIONS

Stack parameters and source emissions for both natural gas and fuel oil firing are given in Table 3-2 and 3-3, respectively. All calculations are based on preliminary engineering design and manufacturer performance data. Stack parameters and emission rates were calculated for International Standards Organization (ISO) conditions. ISO conditions are defined as 59 F ambient dry bulb temperature, sea level (14.7 psia) pressure, and 60 percent relative humidity.

The estimated maximum hourly emissions for the combustion turbine fired on natural gas and fuel oil are based on the design fuel burn rate and the lower heating value (LHV) of the fuels. Duct burning is not proposed for the project.

The nitrogen oxides (NO_x) emission rate for natural gas firing is based on operations with low NO_x burner technology and water injection. These controls result in an outlet concentration of 42 ppmvd referenced to 15 percent oxygen. The NO_x emission rate for fuel oil firing is also based on operations with low NO_x burner technology and water injection. These controls result in an outlet concentration of 65 ppmvd referenced to 15 percent oxygen.

The sulfur dioxide (SO_2) emission rate with natural gas firing is based on a sulfur content of 2,000 grains of sulfur per million cubic feet (MCF) of natural gas and a heat content of 21,515 Btu/lb (904 Btu/ft^3). The SO_2 emission rate for fuel oil combustion is based on a 0.25 percent by weight fuel sulfur content and a heat content of 18,550 Btu/lb (130,800 Btu/gal).

The emission rates of carbon monoxide (CO), volatile organic compounds (VOCs), and particulate matter (PM) were obtained from typical manufacturer performance data for the GE PG6541(B) Frame 6 combustion turbine.

TABLE 3-1. GEP STACK HEIGHT CALCULATIONS FOR EACH BUILDING OR STRUCTURE

The dominant building within 5L is the Unit 1-4 generation building.

Max. Building Height = 60 ft   Max. Projected Width = 302.4 ft

Degree	Building Height ft	Maximum Projected Width ft	GEP Height* ft	Downwash Algorithm
10	60	202	150	Huber/Snyder
20	60	212	150	Huber/Snyder
30	60	239	150	Huber/Snyder
40	60	258	150	Huber/Snyder
50	60	270	150	Huber/Snyder
60	60	274	150	Huber/Snyder
70	60	268	150	Huber/Snyder
80	60	256	150	Huber/Snyder
90	60	235	150	Huber/Snyder
100	60	265	150	Huber/Snyder
110	60	286	150	Huber/Snyder
120	60	299	150	Huber/Snyder
130	60	302	150	Huber/Snyder
140	60	297	150	Huber/Snyder
150	60	282	150	Huber/Snyder
160	60	259	150	Huber/Snyder
170	60	228	150	Huber/Snyder
180	60	190	150	Huber/Snyder
190	60	202	150	Huber/Snyder
200	60	212	150	Huber/Snyder
210	60	239	150	Huber/Snyder
220	60	258	150	Huber/Snyder
230	60	270	150	Huber/Snyder
240	60	274	150	Huber/Snyder
250	60	268	150	Huber/Snyder
260	60	256	150	Huber/Snyder
270	60	235	150	Huber/Snyder
280	60	265	150	Huber/Snyder
290	60	286	150	Huber/Snyder
300	60	299	150	Huber/Snyder
310	60	302	150	Huber/Snyder
320	60	297	150	Huber/Snyder
330	60	282	150	Huber/Snyder
340	60	259	150	Huber/Snyder
350	60	228	150	Huber/Snyder
360	60	190	150	Huber/Snyder

*GEP = Building Height + [1.5 x (Lesser or Building Height or Projected Width)]

TABLE 3-2. COMBUSTION TURBINE STACK PARAMETERS

STACK PARAMETERS

Parameter	HRSG Natural Gas	HRSG No. 2 Fuel Oil	Bypass Natural Gas	Bypass No. 2 Fuel Oil
Fuel LHV (Btu/lb)	21,515	18,550	21,515	18,550
Output (MW)	58.0*	57.3*	39.6	38.9
Heat Constant (MBtu/h)	446.0	443.2	446.0	443.2
Exhaust Temperature (F)	290	290	1,003	1,003
Exhaust Flow (klb/h)	1,121	1,125	1,121	1,125
Exhaust Gas Molecular Weight (lb/lb-mole)	28.187	28.515	28.187	28.515
Exhaust Volumetric Flow (acfm)	362,840	359,946	707,780	702,135
Exhaust Flow Velocity (fpm)	5,456	5,413	5,499	5,456
Exhaust Flow Water Vapor Content (%)	9.7	8.1	9.7	8.1

* HRSG output represents the combined gas and steam turbine capacity.

Notes

1. The HRSG exhaust stack is 125 feet in height and has a cross sectional area of 66.5 square feet and a diameter of 9.2 feet.
2. The bypass stack is 80 feet in height and has a cross sectional area of 128.7 square feet and a diameter of 12.8 feet.

TABLE 3-3. COMBUSTION TURBINE SOURCE EMISSIONS

Pollutant	HRSG Natural Gas	HRSG No. 2 Fuel Oil	Bypass Natural Gas	Bypass No. 2 Fuel Oil
NO_x (ppmvd @ 15% O_2)*	42	65	42	65
NO_x as NO_2 (lb/h)*	75	121	75	121
SO_2 (lb/h)**	0.1	120	0.1	120
CO (ppmvd)*	10	10	10	10
CO (lb/h)*	10	10	10	10
UHC (ppmvw)*	7	7	7	7
UHC (lb/h)*	4	4	4	4
Particulate (lb/h)*	2.5	10	2.5	10

*Manufacturer guaranteed emission rates.
**Natural gas emissions are based on 2,000 gr/MMCF sulfur content. No. 2 fuel oil emissions are based on 0.25 percent sulfur by weight.

Emission rates for other regulated and hazardous air pollutant emissions were based on manufacturers' information and on information contained in the EPA publication Toxic Air Pollutant Emission Factors - A Compilation For Selected Air Toxic Compounds and Sources (EPA-450/2-88-006a). Emissions of beryllium (Be), lead (Pb), mercury (Hg), and sulfuric acid (H_2SO_4) mist were estimated for fuel oil combustion. These pollutants are not found in natural gas firing. Asbestos (As), fluoride (F), and vinyl chloride (C_2H_3Cl) are not found in No. 2 fuel oil or natural gas.

Be, Pb, and Hg is found in No. 2 fuel oil in trace amounts. A typical Be concentration in fuel oil is 2.5×10^{-6} pounds per million Btu. Pb concentrations are estimated at 2.8×10^{-5} pounds per million Btu. Hg concentrations are estimated to be 3.0×10^{-6} pounds per million Btu.

H_2SO_4 mist results from oxidation of the SO_2 in the flue gas to sulfur trioxide (SO_3). The SO_3 then combines with water vapor to form H_2SO_4 mist. Approximately 3 percent of the SO_2 is converted to H_2SO_4 mist. Based on these estimates, the H_2SO_4 mist concentration is 8.1×10^{-3} pounds per million Btu for fuel oil firing, and 9.5×10^{-6} pounds per million Btu for natural gas.

Table 3-4 presents the maximum potential annual emissions from the combustion turbine addition. The results indicate that the new unit will require additional PSD review for SO_2, NO_x, PM, Be, and H_2SO_4 mist. CO, VOC, Pb, As, Hg, C_2H_3Cl, F, and reduced sulfur compounds require no further analyses. PSD review requires a BACT analysis, an ambient air quality impact analysis, and additional impact analysis.

TABLE 3-4. POTENTIAL ANNUAL EMISSIONS FROM THE COMBUSTION TURBINE

Pollutant	Potential Annual Emission Natural Gas (tpy)	Potential Annual Emission Fuel Oil (tpy)	PSD Significance Levels (tpy)	PSD Significant (yes/no)
CO	43.8	43.8	100	no
NO_x	328.5	530.0	40	yes
SO_2	0.6	523.4	40	yes
TSP	11.0	43.8	25	yes
PM_{10}*	11.0	43.8	15	yes
VOC	21.9	21.9	40	no
Lead	0.0	0.05	0.6	no
Asbestos	0.0	0.0	0.007	no
Beryllium	0.0	0.005	0.0004	yes
Mercury	0.0	0.006	0.1	no
Vinyl Chloride	0.0	0.0	1.0	no
Fluorides	0.0	0.0	3.0	no
H_2SO_4 mist	0.019	15.7	7.0	yes
Total Reduced S	<<10	<<10	10	no
Reduced S	<<10	<<10	10	no
H_2S	<<10	<<10	10	no

* The assumption is made that all particulate matter is less than 10 microns in diameter (PM_{10}).

NOTE: Emissions are based on the combustion turbine operating at ISO ambient conditions on natural gas or fuel oil for 8,760 hours per year. PSD significance for a pollutant is triggered if emissions from either fuel type exceed the significance levels.

4.0 MODELING METHODOLOGY

This section discusses the modeling methodology used for determining ambient air quality impacts for SO_2, NO_x, and PM resulting from the proposed combustion turbine addition. The methodology was proposed, reviewed, and approved by FDER in the AAQIA Workplan. Section 5.0 gives the results of the dispersion modeling analysis.

4.1 MODEL SELECTION AND DESCRIPTION

For most air quality modeling assessments, it is desirable to use both screening and refined level dispersion modeling techniques. Screening-level dispersion modeling assumes worst-case meteorological conditions to predict the highest 1-hour ground-level pollutant concentrations for different fuels and operational scenarios. Based on this modeling, a worst-case operating scenario can be determined.

The refined-level dispersion modeling uses actual hourly meteorological data and the predicted worst-case operating scenario to predict the maximum and highest, second-highest ambient pollutant impact concentrations, the location of these impacts, and the area(s) which will be significantly impacted by the source.

The combustion turbine will burn either natural gas or low sulfur No. 2 fuel oil. Tables 3-2 and 3-3 show that the SO_2, NO_x, and PM emissions from fuel oil combustion are significantly higher than natural gas combustion, while the gas flow characteristics are fairly similar. Therefore, it can be concluded without screening-level analysis that fuel oil combustion will result in the higher ground-level pollutant impacts.

The terrain surrounding the plant is relatively flat. Following the recommended EPA guidance for refined models, the Industrial Source Complex Short Term (ISCST) dispersion model was used with five years of hourly meteorological data to predict maximum and highest, second-highest ambient pollutant impacts at receptor locations surrounding the plant site. The ISCST model is designed to predict ambient pollutant impacts for several averaging periods and from a variety of industrial sources. In addition, the model has the ability to evaluate external parameters such as rural or urban environments, and building downwash and cavity impacts.

All recommended EPA default options were utilized. The following is a listing of the options selected for the modeling:

o	Rural-urban option	: rural
o	Wind profile exponents	: default
o	Vertical potential temperature gradient values	: default
o	Final plume rise only	: yes
o	Adjust stack heights for downwash	: yes
o	Buoyancy induced dispersion	: yes
o	Calm processing option	: yes
o	Above ground receptors used	: no

For unstable through stable atmospheric conditions, the wind profile exponents are 0.07, 0.07, 0.10, 0.15, 0.35, and 0.55, respectively.

4.2 RECEPTOR LOCATIONS

Receptor locations were selected with adequate density to ensure that the maximum and highest, second-highest predicted concentrations were determined. Because of the downwash conditions, the 3-hour pollutant impacts were expected to occur within 1,000 meters of the plant. The 24-hour and annual average impacts were also influenced by downwash conditions, but were expected to occur at a greater distance from the source.

Dispersion modeling for the HRSG and bypass stacks was performed with receptors placed along the 36 standard radial directions surrounding the proposed source at the following downwind distances: 100 meter intervals from 100 to 1,000 meters, 250 meter intervals from 1,250 to 3,000 meters, and 1,000 meter intervals from 4,000 to 10,000 meters.

4.3 METEOROLOGICAL DATA

The ISCST dispersion model was used with five years (1982-1986) of sequential hourly surface meteorological data and twice-daily mixing depths. The surface and mixing depths data were selected from a location most representative of the general area being modeled. A representative location corresponds to the station closest to the location being modeled which is in the same climatic regime.

Hourly surface and mixing depth data from the West Palm Beach, Florida NWS reporting station were obtained from FDER (see letter dated 2/14/90 in the attached correspondence section). The data were selected as the most representative of meteorological conditions at the Vero Beach Municipal Power Plant. The data were preprocessed into the "CRSTER" format and all five years were used in the modeling.

5.0 AIR QUALITY IMPACT ANALYSIS

An air quality impact analysis was performed using the modeling methodology approved by the FDER in the AAQIA Workplan and reviewed in Section 4.0. The analysis was performed to determine which pollutants emitted from the combustion turbine project have the potential to impact ambient air quality above PSD ambient air quality "significance levels". In addition, if significant impacts are determined, a "significant impact area" must be defined, preconstruction monitoring requirements need to be examined, and a ambient air quality standard (AAQS) and PSD increment consumption analysis outline must be developed.

5.1 MODELING RESULTS

The results of the refined-level dispersion modeling are presented in Tables 5-1 and 5-2. Appendix A contains a listing of the modeling runs which show the extent of the ambient impacts. One hard copy set of modeling runs and a computer diskette will also be submitted.

The maximum impact location for the annual averaging period is 2,250 meters from the plant. The highest, second-highest 3- and 24-hour average impact locations are 100 and 2,600 meters from the plant, respectively. The location of the 3-hour impact is a result of building downwash effects.

The highest, second-highest 24-hour and maximum annual average impacts for PM (TSP/PM_{10}) are 0.3 and 0.04 ug/m^3, respectively. These values are well below the significant ambient air quality impact levels of 5.0 and 1.0 ug/m^3, respectively. Consequently, no further air quality impact analysis is required for particulates.

The maximum annual average impact for NO_x is 0.5 ug/m^3. This value is below the significant ambient air quality impact level of 1.0 ug/m^3. No further air quality impact is necessary for NO_x.

The highest, second-highest 3-, and 24-hour, and maximum annual average impacts of SO_2 are 21.8, 3.7, and 0.4 ug/m^3, respectively. These values are below the significant ambient air quality impact levels of 25.0, 5.0, and 1.0 ug/m^3, respectively. Therefore, no further air quality impact analysis is required for SO_2.

TABLE 5-1. REFINED MODELING RESULTS - FUEL OIL COMBUSTION

Modeled SO_2 Concentrations

Operating Condition	3-Hour Impact*	24-Hour Impact*	Annual Impact**
Simple Cycle - Bypass			
Concentration (ug/m^3)	21.8	1.8	0.09
Receptor Dist. (m)	100	100	6,000
Receptor Dir. (deg)	260	260	310
Year	1983	1983	1982
Day/Period	20/4	58/1	----
Combined Cycle - HRSG			
Concentration (ug/m^3)	13.8	3.7	0.44
Receptor Dist. (m)	200	2,600	2,250
Receptor Dir. (deg)	260	260	310
Year	1983	1984	1982
Day/Period	20/3	266/1	----

Note: Simple cycle exhausts to the bypass stack at a height of 80 ft.
Combined cycle exhausts to the HRSG stack at a height of 125 feet.

*Concentrations are highest, second-highest values.
**Concentrations are maximum values.

TABLE 5-2. MODELED POLLUTANT IMPACT DETERMINATION

	SO_2			NO_2	PM	
Averaging Time	Annual	3-Hour	24-Hour	Annual	Annual	24-Hour
PSD Significance Level (ug/m^3)	1.0	25.0	5.0	1.0	1.0	5.0
Pollutant Impacts (ug/m^3)*	0.4	21.8	3.7	0.5	0.04	0.3
Year	1982	1983	1984	1982	1982	1984
Distance (m)	2,250	100	2,600	2,250	2,250	2,600
Direction (deg)	310	260	260	310	310	260
Period (day/hour)	---	20/4	266/1	---	---	266/1

*Annual pollutant impacts are based on maximum modeled concentrations. The 3-hour and 24-hour pollutant impacts are based on highest, second-highest modeled concentrations.

5.2 PRECONSTRUCTION MONITORING REQUIREMENTS

Based on the results of the ISCST modeling, pollutant emissions from the project will not result in ambient impacts above PSD de minimis monitoring levels. Therefore, ambient monitoring will not be required.

5.3 SIGNIFICANT IMPACT AREA DETERMINATION

For each PSD applicable pollutant, the extent of the significant impact area must be defined. The radii of significant impacts are determined by extending the receptor array outward until the predicted maximum concentration at the farthest receptor is less than the appropriate ambient significance level.

Modeling results from Section 5.1 show that none of the applicable pollutants have impacts above de minimis levels. Therefore, there is not a significant impact area for this project.

5.4 AAQS AND PSD INCREMENT COMPLIANCE DETERMINATION

Criteria pollutants with ambient air quality impacts above de minimis levels must demonstrate compliance with AAQS and PSD increment consumption. Based on the ISCST modeling results, no compliance determination is required for the project since all impacts are below significance levels.

6.0 BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

6.1 INTRODUCTION

The primary fuel for the Vero Beach Combustion Turbine Project will be natural gas. However, distillate fuel oil will be used as a backup combustion turbine fuel. Pollutant emissions are generally higher when burning distillate fuel oil. Section 3.0 concluded that when fuel oil is used for the maximum project operation (8,760 hours per year), the project's emissions of the following regulated pollutants are subject to PSD review.

- Nitrogen Oxides (NO_x)
- Particulate (Total and PM10)
- Sulfur Dioxide (SO_2)
- Beryllium (Be)
- Sulfuric acid mist (H_2SO_4)

Consequently, this BACT analysis will address the control of emissions of these PSD applicable pollutants when burning either natural gas, or distillate oil firing. Also included are evaluations of the effects of the BACT systems selected on the emissions of unregulated hazardous pollutants.

Under the federal Clean Air Act, BACT represents the maximum degree of pollutant reduction determined on a case-by-case basis considering technical, economic, energy, and environmental considerations. However, BACT cannot be less stringent than the emission limits established by any applicable New Source Performance Standards (NSPS).

This BACT analysis follows the general requirements of EPA's draft "top down" BACT guidance document. This approach requires that the BACT analysis start by assuming the use of the LAER control alternative. Other, less efficient emission control technologies are similarly evaluated when LAER is determined to be unreasonable considering the above factors.

The Florida coordinating group will allow up to 75 percent of the operating reserve requirements for a utility to be supplied by a quick start combustion turbines provided the turbines can supply power within 10 minutes. It is the intent of the Vero Beach combustion turbine project to be able to meet this requirement for peak power demand, as well as utilize a heat recovery steam generator during base load operation. Therefore, only combustion turbines that have the capability to provide power within 10 minutes will be considered for use on this project.

6.2 NITROGEN OXIDES EMISSIONS CONTROL

During combustion, two types of NO_x are formed; fuel NO_x and thermal NO_x. Fuel NO_x emissions are formed through the oxidation of a portion of the nitrogen contained in the fuel. Thermal NO_x emissions are generated through the oxidation of a portion of the nitrogen contained in the combustion air. Nitrogen oxides formation can be limited by lowering combustion temperatures, and staging combustion (a reducing atmosphere followed by an oxidizing atmosphere).

6.2.1 Alternative NOx Emission Reduction Systems

The EPA has established an NSPS limitation for NO_x emissions from electric utility combustion turbines at 75 parts per million dry volume (ppmdv) at 15 percent oxygen (O_2), corrected for fuel nitrogen content and turbine heat rate [40 CFR 60.332(b)]. A review of EPA's BACT/LAER Clearinghouse - A Compilation of Control Technology Determinations (1985 edition) and its 1986, 1987, 1988, and 1989 supplements indicated that the lowest NO_x emission limit established to date for a combustion turbine is 4.5 ppmdv (at 15 percent O_2) for a combustion turbine with a heat recovery steam generator located in California. That permit value was based on the use of water injection into the combustion turbine and a selective catalytic reduction (SCR) system contained within the heat recovery steam generator (combined cycle operation). Therefore, the LAER NO_x emission control alternative for use with combustion turbines is established as water injection followed by an SCR system.

Two other NO_x emission control systems have been identified for evaluation as BACT. Injection of water into the turbine's combustion chamber(s) is capable of limiting NO_x emissions to 42 ppmdv (at 15 percent O_2) when burning natural gas and 65 ppmdv when burning fuel oil. In addition, some combustion turbine manufacturers have recently developed a combustion chamber design which uses massive steam injection to limit NO_x emissions to 25 ppmdv (at 15 percent O_2) when firing natural gas. It is the intent of the Vero Beach Project to use water injection.

In addition to these three alternatives, NO_x emissions from other types of combustion sources have also been controlled through the installation of selective non-catalytic reduction (SNCR) systems such as

Thermal $DeNO_x$. A Thermal $DeNO_x$ system requires gas temperatures of at least 1,500 F for NO_x reduction. The temperature at the outlet of a combustion turbine is too low (950 F to 1,100 F) for such systems. Since raising the flue gas exit temperature to 1,500 F would require supplemental heating of the flue gas, thereby increasing total emissions due to increased fuel usage, this alternative is judged technically unacceptable for application on a combustion turbine.

6.2.1.1 Selective Catalytic Reduction. SCR is a post-combustion method for control of NO_x emissions. The SCR process combines vaporized ammonia with NO_x in the presence of a catalyst to form nitrogen and water. The vaporized ammonia is injected into the exhaust gases prior to passage through the catalyst bed. The SCR process can achieve up to 90 percent reduction of NO_x with a new catalyst. An aged catalyst will provide a maximum of approximately 86 percent NO_x reduction.

The optimum flue gas temperature range for SCR operation is approximately 650 to 750 F. Flue gas from the combustion turbines will typically be 950 F to 1,100 F. Therefore, an SCR would be installed in an intermediate point of the heat recovery steam generator boiler where a temperature of approximately 700 F occurs.

6.2.1.2 Improved Dry Low NOx Combustion Chamber. A combustion turbine manufacturer has begun to market an improved dry low NO_x burner design. These burners provide improved air/fuel mixing and reduced flame temperatures. The result is lower concentrations of NO_x when firing natural gas in comparison to standard combustion chamber design (25 versus 42 ppmdv) and no improvement is achieved when firing fuel oil. However, this combustion technology is not currently available in the combustion turbine size range considered for this project in time to meet the project schedule (see letter dated 2/26/90 from General Electric to Mr. L. W. Sherrill). Larger sized combustion turbines do not qualify for use on this project due to start up times in excess of the 10 minute quick start requirement of the Florida Coordinating group.

6.2.1.3 Water/Steam Injection. Use of water or steam injection in the combustion zones of a combustion turbine can limit the amount of NO_x formed. Thermal NO_x formation is avoided due to lower combustion temperatures resulting from the water or steam injection. Manufacturers' data indicate that water injection may provide better NO_x reduction than steam injection. The degree of reduction in NO_x formation is somewhat proportional to the amount of water injected into the turbine.

Since the combustion turbine NSPS was last revised in 1982, combustion turbines have improved their tolerance to the water necessary to control NO_x emissions below the current NSPS level. However, there is still a point at which the amount of water injected into the turbine seriously degrades the turbine's reliability and operational life. With the manufacturers' existing turbine designs and standard combustors, this generally occurs below a NO_x emission level of about 42 ppmdv (at 15 percent O_2) when firing natural gas and 65 ppmdv when firing fuel oil. These NO_x emission levels can be achieved with little additional cost and without significant impact on reliability or power output over those costs required to comply with the NSPS.

6.2.2 Capital and Operating Costs of Alternatives

Tables 6-1 and 6-2 present the capital and levelized annual costs of the two feasible NO_x control systems for the combustion turbine facility. The incremental annual NO_x emissions are based on natural gas firing for a maximum of 8,760 hours per year in the turbines.

The differential capital costs for the SCR system include the costs of the ammonia storage/injection system, the catalytic reactors, HRSG modifications and balance of plant equipment.

In addition to the 1990 equipment costs of the two alternatives, the total capital costs include a contingency charge, escalation, indirect costs, and interest during construction.

The levelized annual costs assume a total station fuel consumption of 3.9×10^6 MBtu/yr (8,760 h/yr per turbine at base load). This same annual fuel consumption was used in Section 3.0 of this application as the basis for determining pollutant applicability to the PSD Program. Levelized annual costs include operating and maintenance costs, ammonia additive, energy, lost generating capacity and fixed charges on capital investment. The differential energy cost and lost generating capacity for the SCR alternative is the result of the reduced net output of the turbine and the energy requirements of the associated equipment.

TABLE 6-1. COMPARATIVE CAPITAL COSTS OF ALTERNATIVE NOx CONTROL TECHNOLOGY*

	Standard Combustor Design Plus SCR ($1,000)	Standard Combustor Design Plus Water Injection ($1,000)
Differential combustion turbine costs	BASE	BASE
SCR reactors	1,100	NA
Ammonia storage and injection equipment	110	NA
Balance of plant	30	BASE
Direct capital cost (1990)	1,240	BASE
Contingency	120	BASE
Escalation	90	BASE
Direct capital cost	1,450	BASE
Sales Tax	90	BASE
Indirects	220	BASE
Interest during construction	90	Base
Total Capital Costs (1992)	1,850	Base

*Based on one combustion turbine and 8,760 hours/year of natural gas fired operation.

TABLE 6-2. COMPARATIVE LEVELIZED ANNUAL COSTS OF ALTERNATIVE NOx CONTROL TECHNOLOGY*

	Standard Combustor Design Plus SCR ($1,000)	Standard Combustor Design Plus Water Injection ($1,000)
Operation and maintenance costs	400	Base
Ammonia	50	NA
Energy	50	Base
Generating Cost Adjustment	20	BASE
Fixed charges	270	Base
Total Annual Costs	790	Base
Incremental Annual Cost	790	Base
Annual NO_x Emissions (tpy)	70	329
Incremental Annual NO_x Emissions Reduction (tpy)	259	Base
Incremental Levelized Cost per Ton of NO_x Removed ($/ton)	3,050	Base

*Based on one combustion turbine and 8,760 hours/year of natural gas fired operation at ISO conditions (59 F and 60 percent relative humidity).

An incremental levelized annual cost for SCR of $790 thousand/year results in an incremental removal cost of approximately $3,050 per ton of NO_x reduction (259 tons per year).

6.2.3 Other Considerations

Compared to the standard combustion turbine with water injection, the energy requirements of the SCR system would reduce the output of the combustion turbines by approximately one percent.

The use of an SCR system could result in a negative environmental impact due to the release of quantities of unreacted ammonia to the atmosphere. Ammonia and a number of amine compounds are recognized hazardous air pollutants. This represents a potential adverse human health effect. Although ammonia emissions are not regulated nationally, at least one air pollution control district in California recently set a limit of 10 ppm. Unreacted ammonia emissions from an SCR system should average 7 to 10 ppm, and could create objectionable odor and health hazards. Ammonia is also a hazardous material. Accordingly, this material must be handled and stored with extreme care.

The use of fuel oil in combination with an SCR would also have the potential to increase particulate emissions in the form of ammonia sulfate compounds. Due to the inherently higher sulfur content in fuel oil an SCR would oxidize more of the SO_2 to SO_3 and in the presence of unreacted ammonia, sulfate compounds would be formed. Once the flue gas cooled the sulfate compounds would precipitate out in the form of particulate and cause plugging and corrosion of downstream equipment. This is due to the NO_x reduction reaction inefficiencies of the SCR system resulting in incomplete use of the ammonia additive. In addition, the catalytic elements are toxic, and because they have to be replaced periodically, hazardous waste disposal procedures must be followed.

In order for the facility to meet the requirements for spinning reserves and be able to provide power within 10 minutes, the unit will have to be operated for a period of time in a simple cycle mode. Operating in the simple cycle mode would require that the SCR be bypassed in order to prevent permanent damage to the catalyst from the high exhaust gas temperatures due to the HRSG not being in operation. Additionally ambient air modeling did not show any significant impacts for NO_x emissions of 42/65 ppmdv (at 15 percent O_2) when burning natural gas or fuel oil, respectivley.

6.2.4 Conclusions

Installation of an SCR system designed to remove 80 percent of the NO_x exiting the combustion turbine would add approximately $1.9 million to the capital cost of the project for installation downstream of the combustion turbine. Addition of an SCR system increases total levelized annual costs for the project by $790 thousand resulting in an incremental removal cost of $3,050 per ton of NO_x removed while burning natural gas (8760 hrs/yr). Incremental NO_x removal costs would be $2,290 per ton NO_x removed while burning fuel oil (8760 hrs/yr). However, natural gas will be the primary fuel for the project and fuel oil will be used only in the event of an interruption of natural gas supply. The use of and SCR system could result in adverse environmental effects due to unreacted ammonia being released to the atmosphere causing a potential human health hazard. Therefore, based on economic, energy, and environmental considerations, NO_x BACT proposed for this combustion turbine facility is the use of water injection to achieve NO_x emissions of 42/65 ppmdv (at 15 percent O_2) when burning natural gas or No. 2 fuel oil, respectively.

6.3 SULFUR DIOXIDE AND SULFURIC ACID MIST EMISSIONS

The NSPSs established by EPA for emissions from combustion turbines sets a maximum SO_2 level in the flue gas of 150 ppmdv (at 15 percent O_2) and a maximum fuel sulfur content of 0.8 percent by weight (40 CFR 60.333).

The EPA has not established a combustion turbine NSPS for sulfuric acid mist (H_2SO_4). However, the turbine manufacturers' emission data indicate that on average, approximately 3 percent of the SO_2 in the flue gas is oxidized to SO_3, which can combine with water to form H_2SO_4. Therefore, limiting the sulfur content of the fuel will have a beneficial effect on SO_2 and H_2SO_4.

Typically, natural gas has only a trace of sulfur (2,000 grains per million standard cubic feet or less) and no supplemental SO_2 or acid gas mist emission controls have been imposed on natural gas fired combustion turbines. Recent permits for No. 2 fuel oil fired combustion turbines have included limits on maximum allowable fuel sulfur contents. Current BACT/LAER Clearinghouse documents do not list any natural gas, or No. 2 fuel oil fired combustion turbines that are required to use flue gas desulfurization (FGD) systems to meet SO_2 or H_2SO_4 emission requirements. Addition of an FGD system would be a superfluous method of emission control. The significant capital and operating cost associated with a FGD system would result in termination of the project.

The primary fuel for the Vero Beach Combustion Turbine Project will be natural gas. Fuel oil will only be fired in the event of disruptions in natural gas supplies to the project.

The use of low sulfur fuel oil (maximum of 0.25 percent sulfur) would impose no differential capital costs on the project. Additionally modeling showed that no significant impacts for SO_2 emissions resulted when burning 0.25 percent sulfur fuel oil.

Based on economic, energy, and environmental considerations, the limitation of the fuel sulfur content to 0.25 percent by weight is proposed as BACT for the SO_2 and H_2SO_4 emissions during oil firing from the Vero Beach Combustion Turbine Project. Natural gas typically contains only trace amounts of sulfur and no further controls will be necessary.

6.4 PARTICULATE MATTER EMISSIONS

The emission of particulate matter from the combustion turbine facility will be controlled by ensuring as complete combustion of the fuel as possible. The NSPS for combustion turbines do not establish an emission limit for particulate matter. A review of the EPA's BACT/LAER Clearinghouse documents did not reveal any post-combustion particulate matter control technologies being used on gas/oil fueled combustion turbines. The natural gas and distillate oil fuels to be used in the proposed combustion turbines will only contain trace quantities of noncombustible material. The manufacturers' standard combustion turbine operating procedures will ensure as complete combustion of the fuel as possible. Therefore, combustion control is proposed as BACT for total particulate matter and PM-10.

6.5 BERYLLIUM EMISSIONS

The emissions of beryllium (Be) from the combustion turbine facility will be determined by the Be content of the fuels. Natural gas has no measurable Be content and the Be emissions when firing natural gas are predicted to be nil on an annual basis. No. 2 fuel oil typically contains a trace amount of Be, on the order of 2.5×10^{-6} pounds per million Btu (lbs/MBtu). As shown in Table 3-4, the annual Be emissions when firing fuel oil for 8,760 hours/year are predicted to be only 4.9×10^{-3} tons per year (9.7 lbs/yr). While this is above the EPA's significant emission rate of 4.0×10^{-4} tons per year (0.8 lbs/yr), a review of the EPA's BACT/LAER Clearinghouse documents did not reveal any combustion turbine project which has been required to install supplemental pollution control equipment to reduce Be emissions.

6.6 OTHER EMISSIONS

The following sections discuss pollutants which are either below the significant emission levels established for the PSD program or have been identified by EPA as hazardous pollutants. Federal and state regulations do not require that BACT be applied for these pollutants, but the effects of the proposed BACT determinations on these pollutants must be considered.

6.6.1 Carbon Monoxide and Volatile Organic Compounds

Due to the combustion characteristics of a combustion turbine, it is necessary to consider the BACT determination for the emissions of NO_x in establishing the emissions of carbon monoxide (CO) and volatile organic compounds (VOC). Typically, measures taken to minimize the formation of NO_x during combustion inhibit complete combustion which increases the emissions of CO and VOC.

Carbon monoxide and VOC formation are limited by ensuring complete, efficient combustion of the fuel in the turbines. High combustion temperatures, adequate excess air, and good fuel/air mixing during combustion minimize CO and VOC emissions. Therefore, staging combustion and lowering combustion temperatures by water injection, which are used for NO_x emission control, can be counterproductive with regard to CO and VOC emissions.

However, due to advances in combustion turbine design made in the last few years, the increases in CO and VOC emissions are not significant at the levels of water injection necessary to achieve NO_x emissions at the proposed BACT level. Therefore, combustion turbines designed to meet the proposed BACT NO_x emissions of 42/65 ppmdv (gas/oil) will be capable of maintaining CO and VOC emission rates of 10 ppmdv and 7 ppmwv, respectively. At these emission rates, the annual emission rates will not exceed the PSD significance level for these pollutants. The use of a low NO_x combustor or an SCR system would not result in appreciably lower emissions of CO or VOC.

6.6.2 Other Regulated and Hazardous Pollutants

Table 6-3 presents uncontrolled emission estimates for other regulated hazardous pollutants when firing No. 2 fuel oil. These emission rates have been developed based on manufacturers' information and on information contained in the EPA publication Toxic Air Pollutant Emission Factors - A Compilation For Selected Air Toxic Compounds and Sources (EPA-450/2-88-006a).

Of the BACT systems considered in the previous sections of this analysis, only an FGD system for SO_2 control would have significant effects on the emissions of any of the pollutants listed in Table 6-3. However, it was determined in Section 6.3 that an FGD system does not represent BACT for control of SO_2 emissions from the Vero Beach Combustion Turbine Project. When fuel oil is used, no adverse environmental impacts would occur at the tabulated, uncontrolled emission rates.

Other than flue gas desulfurization, the only identified methods of controlling the emission of these pollutants are complete combustion of the fuel and the inherent quality of the fuel. Injection of water into the turbines to control NO_x emissions is not expected to have a significant effect on the emissions of these pollutants. Complete combustion will be required to achieve the identified emission rates of formaldehyde. The quality of the fuel will comply with standard commercial No. 2 fuel oil.

TABLE 6-3. OTHER REGULATED AND HAZARDOUS POLLUTANT EMISSIONS

Pollutant	Emission Rate lbs/MBtu	Annual Emission* tpy
Arsenic	4.2 E-6	0.008
Beryllium	2.5 E-6	0.005
Cadmium	1.1 E-5	0.02
Chromium	4.8 E-5	0.09
Copper	2.8 E-4	0.54
Formaldehyde**	4.1 E-4	0.79
Lead	2.8 E-5	0.05
Manganese	2.6 E-5	0.05
Mercury	3.0 E-6	0.006
Nickel	1.7 E-4	0.33

*Annual emissions are total for one combustion turbine and are based on annual operation of 8,760 hours firing No. 2 fuel oil at ISO conditions (59 F and 60 percent relative humidity) and a fuel burn rate of 443.2 MBtu/h.

**Formaldehyde is also found in natural gas combustion. The emission rates are 8.8 E-5 lb/MBtu or 0.17 tpy.

7.0 ADDITIONAL AMBIENT AIR QUALITY IMPACT ANALYSIS

7.1 VISIBILITY

The nearest PSD Class I area is the Everglades National Park located in southern Florida. In addition, the Big Cyprus National Preserve has been identified as a sensitive area for visibility impacts by the FDER. Because the nearest sensitive area is approximately 190 kilometers from the plant, a Level-1 visibility screening analysis is not required.

7.2 SOILS AND VEGETATION

Ambient air quality standards have been established to protect public health and welfare from any adverse effects of air pollutants. It is not expected that the estimated effects of the proposed project will significantly add to the background pollutant concentrations. Therefore, no adverse effects on soils and terrestrial vegetation is expected.

7.3 GROWTH

The addition of the combustion turbine unit at the Vero Beach Municipal Power Plant is not expected to induce any secondary growth in the surrounding area.

APPENDIX A

LISTING OF MODELING RUNS

071890
VBAAQIA

TABLE A-1. LISTING OF MODELING RUNS SUPPORTING THE CITY OF VERO BEACH, FLORIDA AMBIENT AIR QUALITY IMPACT ANALYSIS

Model Output File (.LST)	Model Input File (.DAT)	Model Stack File (.PNT)	Description
ISCST RUNS - COMBINED CYCLE (1982-1986)			
VB125C82	VB125C82	VERO125C	125-ft HRSG Stack, F.O. Combustion, Std. Receptors - 1982
VB125C83	VB125C83	VERO125C	125-ft HRSG Stack, F.O. Combustion, Std. Receptors - 1983
VB125C84	VB125C84	VERO125C	125-ft HRSG Stack, F.O. Combustion, Std. Receptors - 1984
VB125C85	VB125C85	VERO125C	125-ft HRSG Stack, F.O. Combustion, Std. Receptors - 1985
VB125C86	VB125C86	VERO125C	125-ft HRSG Stack, F.O. Combustion, Std. Receptors - 1986
VB24HR84	VB24HR84	VERO125C	125-ft HRSG Stack, F.O. Combustion - 1984 Fine Grid Receptors*, Day 266 only
VBANN82	VBANN82	VERO125C	125-ft HRSG Stack, F.O. Combustion - 1982 Fine Grid Receptors** Only
ISCST RUNS - SIMPLE CYCLE (1982-1986)			
VB80S82	VB80S82	VERO80S	80-ft Bypass Stack, F.O. Combustion, Std. Receptors - 1982
VB80S83	VB80S83	VERO80S	80-ft Bypass Stack, F.O. Combustion, Std. Receptors - 1983
VB80S84	VB80S84	VERO80S	80-ft Bypass Stack, F.O. Combustion, Std. Receptors - 1984
VB80S85	VB80S85	VERO80S	80-ft Bypass Stack, F.O. Combustion, Std. Receptors - 1985
VB80S86	VB80S86	VERO80S	80-ft Bypass Stack, F.O. Combustion, Std. Receptors - 1986

Standard Receptors: 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.25, 1.5, 1.75, 2.0, 2.25, 2.5, 2.75, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0 km.

*Fine Grid Receptors: 2.6, 2.7, 2.8, 2.9, 3.1, 3.2, 3.3, 3.4 km.
**Fine Grid Receptors: 1.8, 1.9, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7 km.

DRAWINGS AND FIGURES APPLICABLE TO THE

APPLICATION TO CONSTRUCT

FIGURE 1. PLANT SITE LOCATION MAP

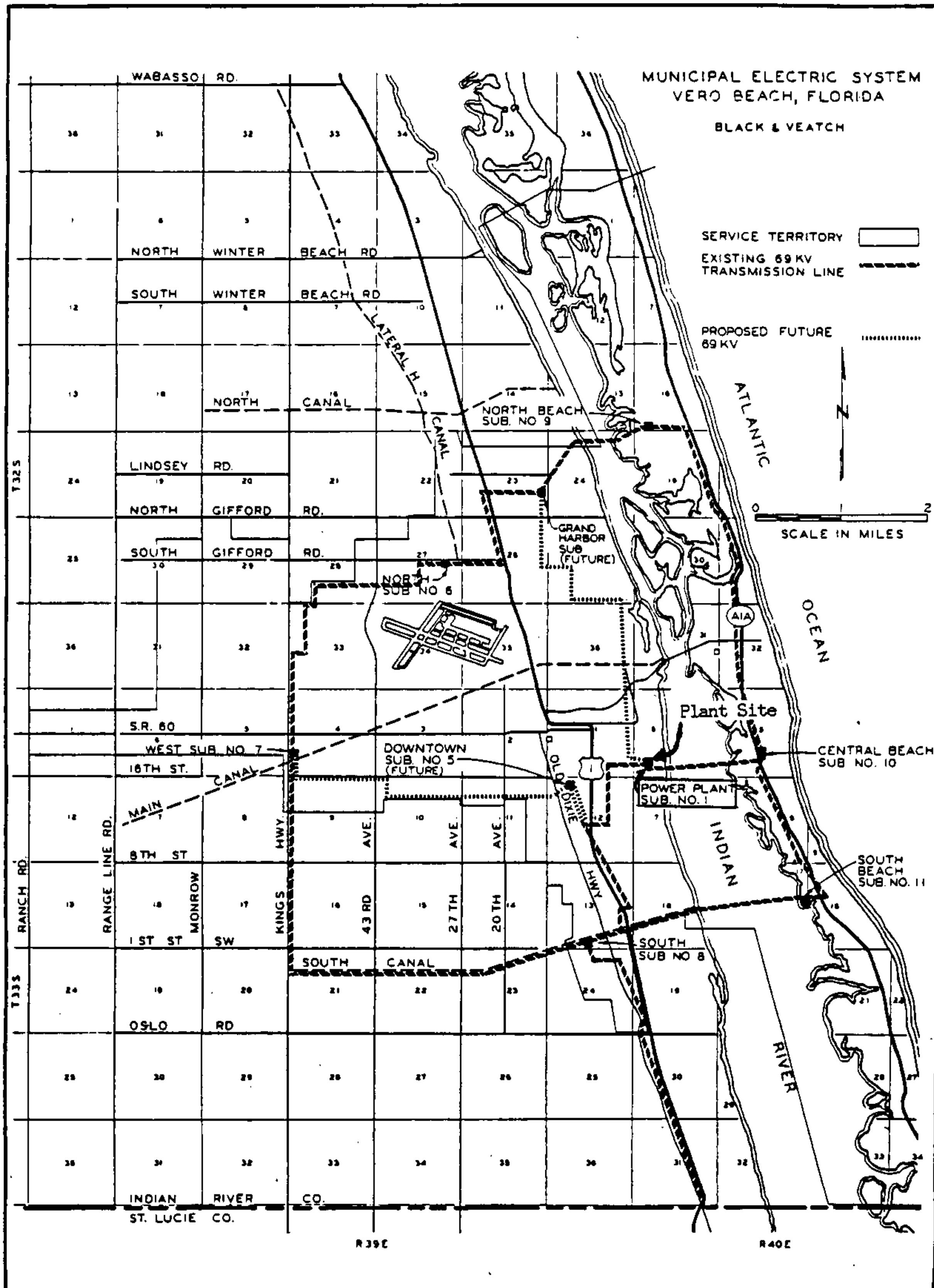


FIGURE 2. PLANT SITE ARRANGEMENT

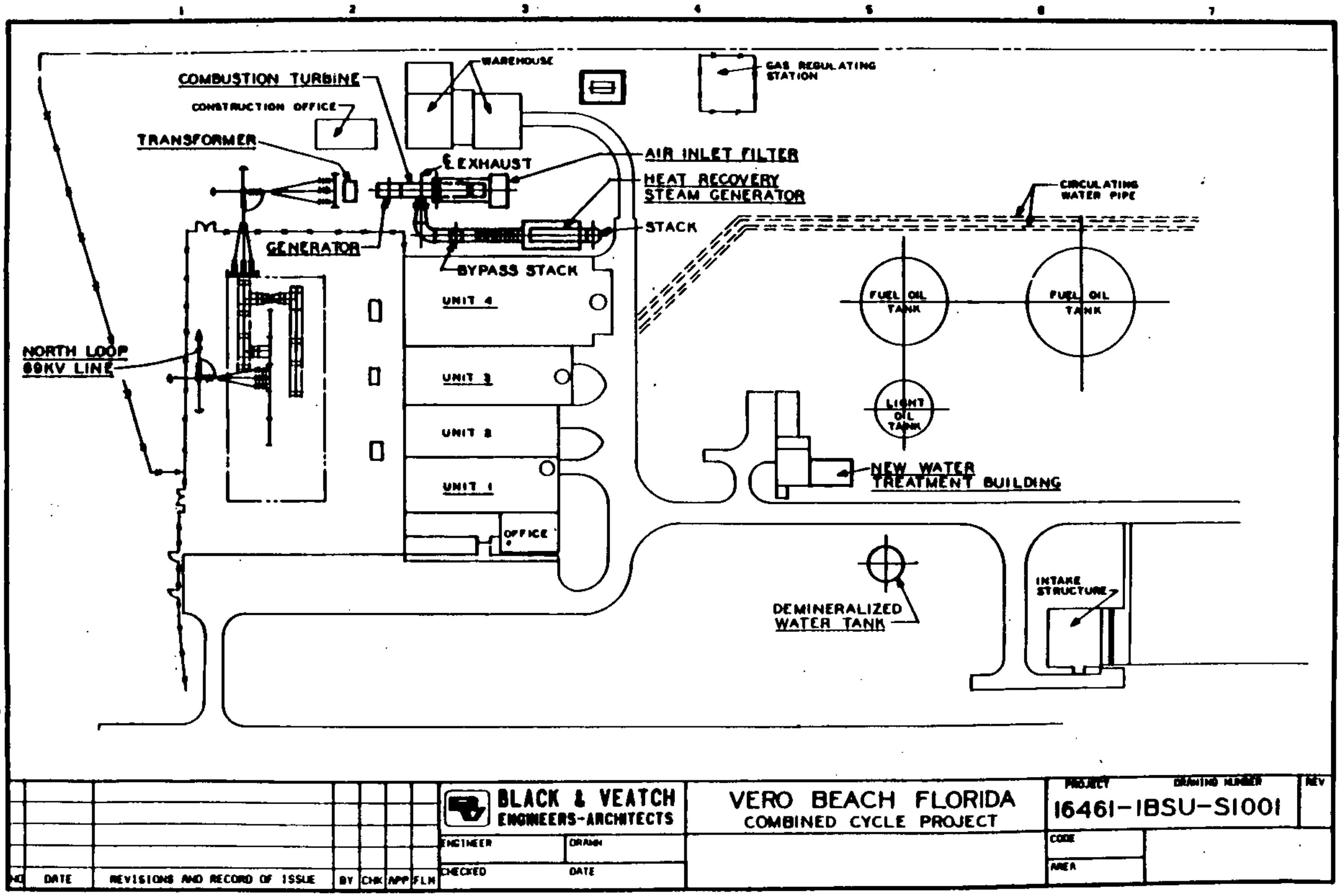
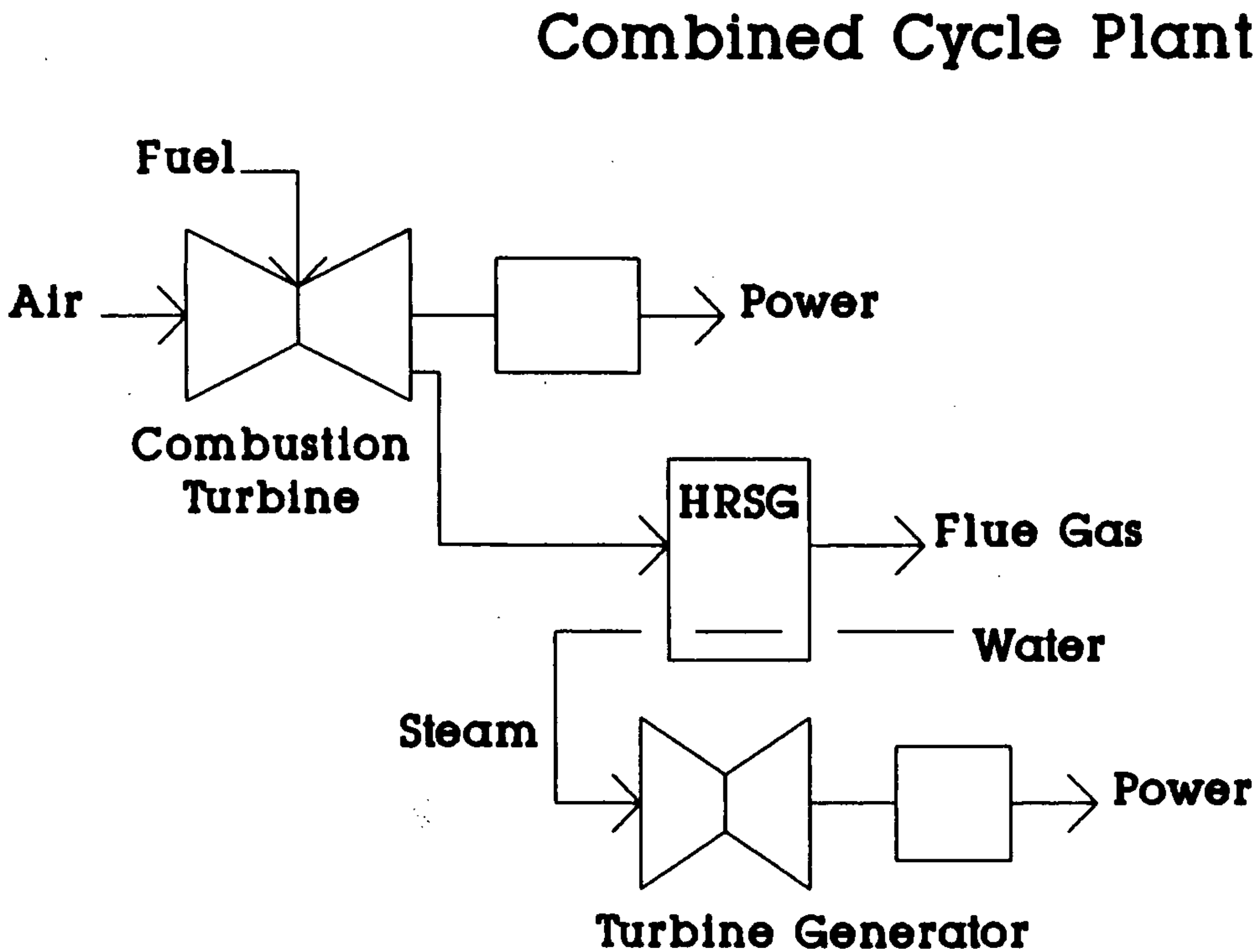


FIGURE 3. PROCESS FLOW DIAGRAM



CORRESPONDENCE AND MEMORANDUM BETWEEN

FDER, BLACK & VEATCH, AND THE CITY OF VERO BEACH

BLACK & VEATCH
ENGINEERS-ARCHITECTS
TEL. (913) 339-2000

1500 MEADOW LAKE PARKWAY
MAILING ADDRESS P.O. BOX NO. 8405
KANSAS CITY, MISSOURI 64114

City of Vero Beach
Municipal Power Plant Expansion
Meteorological Data for Dispersion
Modeling

B&V Project 16834
February 14, 1990

Florida Department of Environmental Regulation
Bureau of Air Quality
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. Max Linn

Gentlemen:

As you requested, enclosed is a nine-track magnetic tape for transference of meteorological data appropriate for dispersion modeling in Vero Beach and Arcadia, Florida. As we discussed, the appropriate upper air and surface data set for the Vero Beach area is West Palm Beach for the period 1982 through 1986. The appropriate data sets for the Arcadia area is Tampa upper air and Ft. Meyers surface for the years 1982 through 1986.

Please return the tape after copying the requested meteorological data. It would be very helpful if each year of data was in a separate file and in the preprocessed format suitable for use as input to the ISCST dispersion model. Additionally, the following tape characteristics would be appreciated.

Format	ASCII
Density	1,600 bpi
Record Length	80 Characters
Block Size	10 Records
UNLABELED	

Please return the tape to me at the above address.

Very truly yours,

BLACK & VEATCH

Michael L. Pelan

Michael L. Pelan

Enclosure

cc: D. W. Nelson

Black & Veatch

TELEPHONE MEMORANDUM

City of Vero Beach
Combustion Turbine Project
Modeling Protocol - Significant Impact
Determination Policy Clarification

B&V Project 16834
B&V File 15.1200
March 14, 1990
12:30 p.m. (MST)

To: Max Linn
Company: FDER
Phone No.: 904 488-1344

Recorded by: Mike Pelan M.J.P.

I contacted Max Linn at Florida DER to ask for a policy clarification regarding significant pollutant impact determinations. PSD guidelines are not clear on whether maximum or highest, second-highest impacts should be used to determine if a pollutant has short-term significant ambient air quality impacts. Some states have required that maximum impacts be used for significant impact and significant impact area determinations. Generally, if five years of meteorology data is used in the analysis, NAAQS and PSD increment analyses are based on highest, second-highest concentrations for short-term averaging periods (1-, 3-, 8-, and 24-hour).

Max stated that it was FDER's policy that if five years of meteorology data is used in the analysis, the highest, second-highest modeled pollutant impact should be used to determine if pollutant impacts are greater than PSD ambient significance levels.

I told Max that based on this interpretation, an analysis of the City of Vero Beach CT project results in ambient impacts below the PSD significance levels for all criteria pollutants. I indicated that an air quality workplan was currently being developed that included the modeling results of this analysis.

If FDER accepts the modeling methodology and conclusions described in the workplan, the PSD permit application process will be greatly simplified. A PSD permit application package will need to include the appropriate state application forms, a BACT analysis for SO_2, NO_x, and particulate matter, and the appropriate application fees. Review time should be greatly reduced as well.

cc: A. Harris
J. May
D. Nelson
W. Sherrill
E. Windisch

BLACK & VEATCH

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

City of Vero Beach, Florida
Combustion Turbine Unit 5 Addition
Air Quality Impact Workplan

B&V Project 16834
B&V File 32.0200
April 12, 1990

Florida Department of Environmental Regulation
Bureau of Air Quality
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Mr. Max Linn

Gentlemen:

Enclosed please find two (2) copies of the Ambient Air Quality Impact Analysis Workplan for the proposed combustion turbine addition to the existing Municipal Power Plant in Vero Beach, Florida. The source will be considered a major modification to an existing major stationary source because the proposed pollutant emissions exceed significant emission levels for SO_2, NO_x, and particulate matter. Therefore a Prevention of Significant Deterioration (PSD) review of the source is required.

The workplan presents an overview of the proposed plant, a discussion of the source characteristics and emission rates, a description of the proposed modeling methodology, preliminary modeling results used to evaluate the significance of the ambient air quality impacts, and an overview of BACT considerations and additional air quality impacts.

The preliminary modeling results indicate that the all pollutants emitted from the source will have ambient impacts below PSD ambient air quality significance levels. Therefore, according to PSD guidance, no further air quality analyses are required. Also, because the predicted ambient impacts of the proposed addition are below PSD de minimis monitoring levels, one year of preconstruction monitoring data will not be required. A 5-1/4" computer diskette which contains all modeling data is also enclosed.

A completed permit application, including revised dispersion modeling results and a BACT analysis will be submitted to the DER shortly after review and approval of this workplan. In keeping with our schedule, we would appreciate a response on the adequacy of the workplan by May 15, 1990.

If you have any questions, please direct them to Mr. Michael Pelan at (913) 339-2699.

Very truly yours,

BLACK & VEATCH

L. W. Sherrill

mlp
Enclosure

cc: Mr. Shuler Massey, w/2 copies

Florida Department ... ental Regulation
Twin Towers Office Bldg. • 2600 ... Tallahassee, Florida 32399-2400
Bob Martinez, Governor Dale T... John Shearer, Assistant Secretary

June 5, 1990

JUN 8 REC'D
16834.32.0402
cc: Studer Macaulay
Anne Harrison
Jim May
Mike Pelan

L. W. Sherrill
Black & Veatch
8400 Ward Parkway
P. O. Box No. 8405
Kansas City, MO 64114

Dear Mr. Sherrill:

I have reviewed the Ambient Air Quality Impact Analysis Workplan for the proposed combustion turbine addition to the Vero Beach Municipal Power Plant you submitted to the Department. This workplan is acceptable. I have the following comments, though.

I discussed two minor errors with Mike Pelan in Tables 5-2 and 5-3 and asked him to submit revised tables with the PSD application. Also, I asked him to provide the dimensions of the dominant structure influencing the combustion turbine stack and to show how the wind direction specific building dimensions used for the building downwash inputs to the ISCSCT model were calculated.

If you have any questions, please call me at (904)488-1344.

Sincerely,

Cleve Holladay

Cleve Holladay
Meteorologist
Bureau of Air Regulation

CH/plm

City of Vero Beach
100 - 17th STREET - P. O. BOX 1389
VERO BEACH, FLORIDA - 32961-1389
Telephone: (407) 562-7231

MUNICIPAL POWER PLANT

RECEIVED
DER - MAIL ROOM
1990 AUG 13 AM 11:43

July 31, 1990

State of Florida
Department of Environmental Regulation
Bureau of Air Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301-2400@

Attention: Mr. Clair Fancy - Bureau Chief

Gentlemen:

Enclosed please find six (6) copies of the Application to Construct Air Pollution Sources for the City of Vero Beach Combustion Turbine Project. Included with the applications are supporting documentation including the Ambient Air Quality Impact (AAQIA) and the Best Available Control Technology (BACT) analyses. Also enclosed is a check in the amount of $5,000 payable to the Department of Environmental Regulation as specified in regulation 17-4.050 (4)(a).

The AAQIA methodology is in accordance with that presented in a Workplan submitted to and approved by the Bureau. The letter of approval has been included along with other correspondence on the permit application preparation. A hard copy and a computer diskette copy of the modeling results to support the AAQIA are included.

It is our understanding of the Florida permit rules that the FDER will make a completeness determination within 30 days of receipt of the application and processing fee. Subsequently, the application will be declared approved or disapproved within 90 days of determination of a completed application.

If you have any questions or need additional information, please contact me at (407) 562-7231 or Mr. Michael Pelan at (913) 339-2699.

Very truly yours,

CITY OF VERO BEACH

Shuler W. Massey

Shuler W. Massey
Director of Power Resources

SWM/dg

cc: J. Heron
C. Halladay
B. Andrews

C. Collins, C Dist,
M. Armentrout, EPA

Enclosure

REMITTANCE ADVICE

CITY OF VERO BEACH VERO BEACH, FLORIDA

131608

	INVOICE NUMBER	INVOICE DATE	P. O. NUMBER	ENTRY DATE	TYPE	GROSS AMOUNT	DESCRIPTION	DISCOUNT	NET AMOUNT
32.0402		072790	10716-K	080990	1	500000	16834/AIR PER APPL		500000
				TOTALS		500000			500000

TYPE CODES 01 INVOICE 02 CREDIT

DETACH AND RETAIN THIS STATEMENT WITH YOUR RECORDS

FIRST UNION NATIONAL BANK
OF FLORIDA
VERO BEACH, FL 32960

CITY OF VERO BEACH

VERO BEACH, FLORIDA

VENDOR NUMBER

08070

WORKING FUND ACCOUNT

DATE	NET AMOUNT	CHECK NO
080990	$****5000.00	131608

NOT VALID AFTER 90 DAYS

DEPT OF ENVIRONMENTAL REG
3319 MAGUIRE AVE
SUITE 232
ORLANDO FL 32801

DIRECTOR OF FINANCE

COUNTERSIGNED

⑈131608⑈ ⑆063210125⑆1060008170⑈