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AC53-251898	
PSD-FL-216	

PS Form 3800, March 1993



Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

October 10, 1994

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Robert W. Carter, Chairman
Panda Energy Corporation
Panda-Kathleen, L.P.
4100 Spring Valley, Suite 1001
Dallas, TX 75244

Dear Mr. Carter:

Attached is a copy of the revised Technical Evaluation and Preliminary Determination, proposed permit and the Best Available Control Technology evaluation to construct a 115 MW cogeneration facility consisting of one combined cycle gas turbine generator and associated steam cycle.

Please replace the previously issued Technical Evaluation and Preliminary Determination dated August 25, 1994 with this copy. Submit any written comments for consideration concerning the Department's proposed action to Mr. John Brown of the Bureau of Air Regulation.

Sincerely,

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

CHF/SA/bjb

Attachments

cc: B. Thomas, SWD
T. Davis, P.E., ECT
J. Harper, EPA
J. Bunyak, NPS
L. Novak, Polk County

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CERTIFIED MAIL

In the Matter of an
Application for Permit by:

DEP File No. AC 53-251898
PSD-FL-216
Polk County

Panda-Kathleen, L.P.
4100 Spring Valley
Suite 1001
Dallas, TX 75244

INTENT TO ISSUE

The Department of Environmental Protection (Department) hereby gives notice of its intent to issue a construction permit (copy attached) for the proposed project as detailed in the application specified above for the reasons stated in the attached revised Technical Evaluation and Preliminary Determination.

The applicant, Panda-Kathleen, L.P., applied on June 6, 1994, to the Department of Environmental Protection for a permit to construct a 115 MW cogeneration facility consisting of one combined cycle gas turbine generator and associated steam cycle; also, steam will be provided to a host manufacturing operation, which will produce industrial grade distilled water. The proposed facility will be located near Lakeland, Polk County, Florida.

The Department has permitting jurisdiction under the provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.). The project is not exempt from permitting procedures. The Department has determined that a construction permit is required for the proposed work.

Pursuant to Section 403.815, F.S. and Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue Permit. The notice shall be published one time only within 30 days in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. The applicant shall provide proof of publication to the Department's Bureau of Air Regulation, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within seven days of publication. Failure to publish

the notice and provide proof of publication within the allotted time may result in the denial of the permit.

The Department will issue the permit with the attached conditions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the public notice or within 14 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information;

- (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;
- (b) A statement of how and when each petitioner received notice of the Department's action or proposed action;
- (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;
- (d) A statement of the material facts disputed by Petitioner, if any;
- (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;
- (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,
- (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be

filed (received) within 14 days of receipt of this intent in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION



C. H. Fancy, P.E., Chief
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399
904-488-1344

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this INTENT TO ISSUE and all copies were mailed by certified mail before the close of business on 10/11/94 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT
FILED, on this date, pursuant to §120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.


Clerk

10/11/94
Date

Copies furnished to:

- cc: B. Thomas, SWD
- T. Davis, P.E., ECT
- J. Harper, EPA
- J. Bunyak, NPS
- L. Novak, Polk County

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

AC 53-251898
PSD-FL-216

The Department of Environmental Protection gives notice of its intent to issue a permit to Panda-Kathleen, L.P., 4100 Spring Valley Suite 1001, Dallas, TX 75244, to construct a 115 MW cogeneration facility consisting of one combined cycle gas turbine generator and associated steam cycle; also, steam will be supplied to a host manufacturing operation, which will produce industrial grade distilled water. The proposed facility will be located near Lakeland, Polk County, Florida. A determination of Best Available Control Technology was required. Modeling results show that increases in ground-level concentrations are less than Prevention of Significant Deterioration (PSD) significant impact levels for PM/PM₁₀ and NO_x, in both the Class II and Class I areas surrounding the plant. These emissions will not cause or contribute to a violation of any ambient air quality standard or PSD increment. The Department is issuing this Intent to Issue for the reasons stated in the revised Technical Evaluation and Preliminary Determination.

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

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner

contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and, (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, Florida Administrative Code.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Department of Environmental Protection
Bureau of Air Regulation
111 S. Magnolia Drive, Suite 4
Tallahassee, Florida 32301

Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619-8218

Any person may send written comments on the proposed action to Mr. John Brown at the Department of Environmental Protection, Bureau of Air Regulation, Mail Station 5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. All comments received within 14 days of the publication of this notice will be considered in the Department's final determination.

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

File

Revised Technical Evaluation
and
Preliminary Determination

Panda-Kathleen, Limited Partnership (L.P.)
Polk County, Florida

COMBINED CYCLE COMBUSTION TURBINE
(115 megawatts)

Construction Permit
AC 53-251898
PSD-FL-216

Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation

October 10, 1994

SYNOPSIS OF APPLICATION

I. GENERAL INFORMATION

A. Name and address of applicant

Panda-Kathleen, L.P.
4100 Spring Valley, Suite 1001
Dallas, TX 75244

B. Reviewing and Process Schedule

Date of Receipt of Application: June 6, 1994

Application Completeness Date: September 19, 1994

C. Facility Location

This facility is located at 800 McCue Road, Lakeland, Polk County, Florida. The UTM coordinates are Zone 17, 398.65 km east and 3101.45 km north.

Facility Identification Code (SIC)

Major Group No. 49 - Electric, Gas and Sanitary Services.

Industry Group No. 491 - Combination Electric, Gas and Other Utility Services.

Industry Group No. 4911 - Electric and Other Services Combined.

D. Project Description

The proposed Panda-Kathleen, L.P., cogeneration facility in Polk County is classified as a major emitting facility. The proposed project will be capable of producing a nominal 115 megawatts (MW) of electricity. The combined cycle (CC) unit will consist of one nominal 75 MW combustion turbine (CT), one unfired and nominal 40 MW heat recovery steam generator (HRSG), and one steam turbine. The CT will be fired primarily on natural gas, with low sulfur fuel oil ($\leq 0.05\%$, by weight, sulfur) as back-up. Fuel oil combustion shall not exceed 500 hours per year.

The Panda-Kathleen cogeneration facility will include a host manufacturing operation, which will produce industrial grade distilled water. The host operation will utilize steam from the HRSG and wastewater from the cooling tower as its main ingredients. The steam will be used to transfer heat to the feed water (cooling tower blowdown), causing evaporation of the distillate to take place. The distillate (in vapor form) is then condensed to liquid form in a water-cooled condenser housed in the distilled water plant. The operation of the distilled water plant will produce no emissions of air pollutants.

E. Project Emissions

The proposed project, a combined cycle combustion turbine, will produce maximum emissions of 281 tons per year (TPY) of nitrogen oxides (NO_x); 25 TPY of sulfur dioxide (SO₂); 59 TPY of carbon monoxide (CO); 31 TPY of particulate matter (PM/PM₁₀); 23 TPY of volatile organic compounds (VOC); 0.0007 TPY of beryllium; 0.01 TPY of lead; 0.001 TPY of inorganic arsenic; and, 4 TPY of sulfuric acid mist, if operated at 8760 hrs/yr (8,260 hrs/yr on natural gas and a maximum of 500 hrs/yr on fuel oil) with an Asea Brown Boveri (ABB) CT. If a General Electric (GE) CT is selected, the proposed project will produce maximum emissions of 281 TPY of NO_x; 25.3 TPY of SO₂; 257 TPY of CO; 36.5 TPY of PM/PM₁₀; 43.8 TPY of VOC; 0.0007 TPY of beryllium; 0.01 TPY of lead; 0.0011 TPY of inorganic arsenic; and, 4 TPY of sulfuric acid mist, if operated at 8760 hrs/yr (8,260 hrs/yr on natural gas and a maximum of 500 hrs/yr on fuel oil). The No. 2 fuel oil will be limited to maximum of 0.05% sulfur content, by weight.

II. RULE APPLICABILITY

The proposed project, construction of a 115 MW combined cycle unit (SIC 4911), in Polk County, is subject to the preconstruction review under the provisions of Chapter 403, Florida Statutes, Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.), and 40 CFR 60 (July 1, 1993 version).

This facility is located in an area designated attainment for all criteria pollutants in accordance with F.A.C. Rule 62-275.400.

The proposed project was reviewed under Rule 62-212.400(5), F.A.C., New Source Review (NSR) for Prevention of Significant Deterioration (PSD), because it will be a major new stationary source. This review consisted of a determination of Best Available Control Technology (BACT) and, unless otherwise exempted, an analysis of the air quality impact of the increased emissions. The review also includes an analysis of the project's impacts on soils, vegetation and visibility, along with air quality impacts resulting from associated commercial, residential and industrial growth.

The proposed facility shall be in compliance with all applicable provisions of Chapters 62-212 and 62-4, F.A.C., and the 40 CFR 60 (July 1, 1993 version). The proposed source shall be in compliance with all applicable provisions of Rule 62-210.650, F.A.C.: Circumvention; Rule 62-210.700, F.A.C.: Excess Emissions; Rule 62-296.800, F.A.C.: Standards of Performance for New Stationary Sources (NSPS); Chapter 62-297, F.A.C.: Stationary Sources - Emissions Monitoring; and, Rule 62-4.130, F.A.C.: Plant Operation-Problems.

The proposed facility shall be in compliance with the New Source Performance Standards (NSPS) for Gas Turbines, Subpart GG, and for Volatile Organic Storage Vessels, Subpart Kb, which are contained in 40 CFR 60, and are adopted by reference in Rule 62-296.800, F.A.C.

III. TECHNICAL EVALUATION

The applicant proposes to install a combined cycle combustion turbine generator at the proposed facility near Lakeland in Polk County. This generator system will consist of one nominal 75 MW CT, with exhaust heat recovery through an unfired HRSG, which will be used to power a 40 MW steam turbine. The proposed facility will include a 475,000 gallon fuel oil storage tank. The proposed facility will be capable of producing a nominal 115 MW of electricity.

The primary fuel to the CT will be natural gas. No. 2 fuel oil, with a maximum sulfur content of 0.05%, by weight, will be used as a back-up fuel only and allowed a maximum of 500 hours per year of use. For the remaining 8,260 hours, the CT will be fueled by natural gas. The emissions of nitrogen oxides (NO_x) represent a significant proportion of the total emissions generated by this project. The BACT for NO_x, as determined by the Department, will be met by using low-NO_x combustors to limit emissions to 15 ppmvd, corrected to 15% O₂ and ISO conditions [ISO standard day conditions means 288 degrees Kelvin (59°F), 60 percent relative humidity and 101.3 kilopascals pressure], when burning natural gas; and, water injection to limit emissions to 42 ppmvd, corrected to 15% O₂ and ISO conditions, when burning No. 2 fuel oil. The 15 ppmvd NO_x emission limit for gas will be adjusted downward if a lower limit is demonstrated to be achievable, as discussed in the BACT determination and in the permit. The facility is subject to PSD and BACT for NO_x emissions because the proposed increase in annual NO_x emissions exceeds the significant emission rate. Compliance with the NO_x emission standards will be determined by stack tests and will be monitored continuously.

Particulate matter (PM/PM₁₀) emissions from the combined cycle combustion turbines will be minimized by combustion control and the use of clean fuels. The Department agrees with the applicant's rationale that there are no feasible methods to control inorganic arsenic, beryllium, and other trace pollutants, except by requiring good quality fuel. The limit of sulfur to 0.05%, by weight, is the requirement that assures good quality fuel. The proposed facility is subject to PSD and BACT for PM/PM₁₀ emissions because the proposed increase in annual PM/PM₁₀ emissions exceeds the significant emission rate. Compliance will be determined by periodic stack tests.

SO₂ emissions will be controlled by the use of low sulfur fuel. The No. 2 fuel oil, which will be used as a back-up fuel only and limited to a maximum of 500 hrs/yr, will be limited to a maximum sulfur content of 0.05%, by weight. The proposed facility is not subject to PSD and BACT for SO₂ emissions, because the proposed increase in annual SO₂ emissions does not exceed the significant emission rate.

CO and VOC emissions will be minimized by combustion control to assure proper fuel mixing and complete fuel combustion. The facility is subject to PSD and BACT for CO and VOC emissions if a GE CT is selected, because the proposed increase in annual CO and VOC emissions exceeds the significant emission rate. Compliance with the emission standards for CO and VOCs will be determined by periodic compliance tests.

The proposed facility is subject to the PSD regulations for beryllium (Be) and inorganic arsenic (As). These pollutants are caused primarily by the contaminants in the fossil fuels. Emissions will be controlled by limiting the quantity of fossil fuel that can be burned. Compliance for these pollutants shall be determined by stack tests.

The following table summarizes the emissions of air pollutants subject to PSD review:

<u>Pollutant</u>	<u>Emissions (TPY)*</u>			<u>PSD Significant Emission Rate (TPY)</u>
	<u>Gas</u>	<u>Oil</u>	<u>Total</u>	
NO _x	235	46	281	40
PM/PM ₁₀	30.6	5.9	36.5	15
CO	239.5	17.5	257	100
VOC	41.3	2.5	43.8	40
Be	Neg.	0.0007	0.0007	0.0004
As	Neg.	0.0011	0.0011	Any

*Based on firing: No. 2 fuel oil at a maximum of 500 hrs/yr and as a back-up fuel only; and, natural gas for 8,260 hrs/yr; also, both are maximum emissions for either CT.

IV. AIR QUALITY IMPACT ANALYSIS

1. Introduction

The proposed Panda-Kathleen cogeneration facility will emit six pollutants in PSD significant amounts. They are the pollutants CO, NO_x, PM/PM₁₀, VOC, and non-criteria pollutants Be and inorganic As. (see Table 1).

The air quality impact analysis required by the PSD regulations for these pollutants includes:

- * An analysis of existing air quality;
- * A PSD increment analysis;
- * An Ambient Air Quality Standards (AAQS) analysis;
- * An analysis of impacts on soils, vegetation, and visibility and of growth-related air quality modeling impacts; and,
- * A "Good Engineering Practice" (GEP) stack height determination.

The analysis of existing air quality generally relies on preconstruction monitoring data collected with EPA-approved methods. The AAQS analysis depends on the air quality dispersion modeling carried out in accordance with EPA guidelines.

Based on the required analysis, the Department has reasonable assurance that the proposed Panda-Kathleen cogeneration facility, as described in this report and subject to the conditions of approval proposed herein, will not cause or contribute to a violation of any ambient air quality standard or PSD increment. However, the following EPA-directed stack height language is included: "In approving this permit, the Florida Department of Environmental Protection has determined that the application complies with the applicable provisions of the stack height regulations as revised by EPA on July 8, 1985 (50 FR 27892). Portions of the regulations have been remanded by a panel of the U.S. Court of Appeals for the D.C. Circuit in NRDC v. Thomas, 838 F. 2d 1224 (D.C. Cir. 1988). Consequently, this permit may be subject to modification if and when EPA revises the regulation in response to the court decision. This may result in revised emission limitations or may affect other actions taken by the source owners or operators." A discussion of the modeling methodology and required analysis follows.

2. Analysis of Existing Air Quality

Preconstruction ambient air quality monitoring may be required for pollutants subject to PSD review. However, an exemption from the monitoring requirement can be obtained if the maximum air quality impact resulting from the projected emissions increase, as determined through air quality modeling, is less than a pollutant-specific de minimus concentration. Pollutants which do not have a specified de minimus level may also be exempt from preconstruction monitoring requirements. In addition, if an acceptable ambient monitoring method for the pollutant has not been established by EPA, monitoring is not required.

The maximum concentrations predicted for the proposed project, as compared with the PSD de minimus monitoring concentrations, are presented in Table 2.

The maximum 8-hour CO impact was predicted to be 14.5 micrograms per cubic meter (ug/m^3). The concentration is below the 574 ug/m^3 de minimis level. The maximum 24-hour PM/PM₁₀ impact was predicted to be 4.16 ug/m^3 . The concentration is below the 10 ug/m^3 de minimis level. The maximum annual NO_x impact was predicted to be 0.11 ug/m^3 , which is below the 14 ug/m^3 de minimis level. The maximum 24-hour beryllium impact was predicted to be 0.0005 ug/m^3 , which is below the 0.001 ug/m^3 de minimis level. Therefore, preconstruction monitoring is exempt for pollutants CO, PM/PM₁₀, NO_x, and beryllium.

Preconstruction monitoring for Ozone is triggered by a net increase in VOC emissions of 100 TPY or more. Because the maximum expected increase in VOC emissions from the proposed cogeneration facility operating within its normal load range is estimated to be 43.8 TPY, preconstruction monitoring is not required.

Inorganic arsenic does not have a defined de minimis level, so ambient monitoring for this pollutant is not required. Therefore, preconstruction monitoring is not required for this project.

3. Modeling Methodology

A. Model Selection

For this study, air quality models were applied at two levels. The first, or screening level, provided conservative estimates of impacts from the cogeneration unit. The second, or refined level, provided a more accurate estimate of source impacts.

For the screening purposes, the SCREEN2 model is used in the analysis. SCREEN2 is a simple model that calculates 1-hour average concentrations over a range of meteorological conditions.

For the configurations shown in the screening analysis to produce the highest impacts, criteria pollutant emissions from the proposed Panda-Kathleen cogeneration facility were modeled using the ISC2 models.

The EPA-approved Industrial Source Complex (ISC2) dispersion model was used in refined modeling of the air quality impact analysis. The ISC2 models are steady-state Gaussian plume models that can be used to assess air quality impacts over simple terrain from a wide variety of sources. The ISC2 models are capable of calculating concentrations for averaging times ranging from hourly to annually. The ISCST2 (short-term) was used to calculate ambient impacts with averaging times between 1 to 24 hours. The ISCLT2 (long-term) was used to calculate ambient impacts for annual averaging times. A series of specific model features recommended by the EPA are referred to as the regulatory options. The

applicant used the EPA recommended regulatory options in each modeling scenario. Direction-specific downwash parameters were used because the stacks were less than the good engineering practice (GEP) stack height.

B. Meteorological Data

Detailed meteorological data are needed for modeling with the ISCST2 and ISCLT2 models. ISCST2 requires a preprocessed data file compiled from hourly surface observations and concurrent--twice-daily rawinsonde soundings. ISCLT2 requires a statistical tabulation of the joint frequency of occurrence of wind speed, wind direction, and atmospheric stability category. These frequency distributions are commonly referred to as STAR data, abbreviated for Stability Array.

Meteorological data used in the modeling consisted of five years (1982-1986) of hourly surface data taken at the National Weather Service station in Tampa, Florida. Mixing heights used in the modeling were based on upper air data from Ruskin (near Tampa), Florida. For western Polk County, surface data from Tampa and mixing height data from Ruskin are appropriate.

C. Receptor

Receptors were placed at locations considered to represent ambient air were located at the property boundaries. For the SCREEN2 model, the receptor grid was started at 100 meters and extended out to 10,000 meters from the center of the proposed facility.

For the ISC2 models, a polar receptor grid was used. Receptor rings were placed at distances of 200, 300, 400, 500, 750, 1000, 1500, 2000, 2500, 3000, 4000, 5000, 6000, 7000, 8000, and 10,000 meters from the center of the proposed facility.

The Chassahowitzka Wilderness Area is approximately 85 km from the site. The maximum PSD increment consumption for the Chassahowitzka Wilderness Area was determined for the proposed facility using 13 discrete receptors located along the boundary of the Class I area.

4. Results

A. Significant Impact Analysis

A summary of impacts from the screening analysis considered for all scenarios in the modeling analysis are presented in Table 2 and compared with the significant impact levels and de minimus monitoring levels.

The maximum predicted 1-hour and 8-hour CO concentrations, due to the proposed facility, are 38.6 and 14.5 ug/m³, respectively. Since these maximum concentrations are below the significance and de minimis levels, no further analysis is necessary for this pollutant.

The maximum predicted 24-hour and annual average PM/PM₁₀ concentrations, due to the proposed facility, are 4.16 and 0.02 ug/m³, respectively. Since these maximum concentrations are below the significance and de minimis levels, no further analysis is necessary for PM/PM₁₀.

The maximum predicted annual NO₂ concentration, due to the proposed facility, is 0.11 ug/m³. Because the level of impact is below the significance and de minimis levels, no further modeling analysis was performed.

B. Class I Area

The maximum NO₂ and PM/PM₁₀ concentrations, which are predicted for the PSD Class I area of the Chassahowitzka National Wilderness Area and compared with the National Park Service (NPS)-recommended Class I significance levels, are presented in Table 3.

The maximum NO₂ annual concentration of 0.006 ug/m³ is less than the NPS-recommended Class I NO₂ annual significance level of 0.025 ug/m³.

The maximum predicted PM/PM₁₀ 24-hour and annual concentrations in the Class I area are 0.057 and 0.0009 ug/m³, respectively. These predicted impacts are below the NPS-recommended Class I 24-hour and annual significance levels of 0.33 and 0.08 ug/m³, respectively.

As the results indicate, the proposed facility's impacts are below the NPS-recommended Class I significance values for all averaging periods and modeled pollutants. Therefore, no further Class I modeling analysis was conducted.

C. Air Toxics Analysis

The maximum impacts of regulated and nonregulated toxic air pollutants that will be emitted by the proposed facility are presented in Table 4. The modeling results were compared with the Acceptable Ambient Concentrations. The predicted concentrations for each of these pollutants are less than their respective Acceptable Ambient Concentrations.

5. Additional Impacts Analysis

A. Impacts on Soils and Vegetation

Because the predicted impacts for all pollutants considered in the analysis are less than the significant impacts, the facility is not expected to have a significant adverse effect on regional vegetation or soils.

B. Impact on Visibility

The proposed Panda-Kathleen cogeneration facility is located approximately 85 km from the Chassahowitzka Wilderness Area. Impacts to visibility were estimated using the VISCREEN computer model. Impacts were calculated for particulate matter and nitrogen oxides.

Results of the Level I visibility impact analysis, due to the proposed project, are less than the screening criteria both inside and outside the Class I area. Therefore, emissions from the proposed facility will not have a significant impact on visibility in this area.

C. Growth-Related Air Quality Impacts

A limited number of personnel will be used to operate the proposed facility. These personnel are not expected to have a significant effect on the residential, commercial, and industrial growth in Polk County.

V. CONCLUSION

Based on the information presented by the applicant, the Department has been provided reasonable assurances that the proposed Panda-Kathleen cogeneration facility to produce 115 MW, as described in the application and subject to the conditions of approval proposed herein, will not cause or contribute to any violation of any PSD increment, ambient air quality standard, or any other technical provision of Chapter 62-212 of the Florida Administrative Code.

John Brown Jr.
Oct 10, 1994

Table 3. PSD Class I Increment Analysis

Pollutant	Avg. Time	Maximum Predicted Impact (ug/m3)	Class I Area Significant Level (ug/m3)
NO ₂ **	Annual	0.006	0.025
PM(PM10)	24-hour	0.057	0.33
	Annual	0.0009	0.08

** Assume all NOx are converted into NO₂.

Table 4. Air Toxic Reference Level Analysis

Pollutant	Avg. Time	Maximum Predicted Impact (ug/m3)	Air Toxics Reference Level (ug/m3)
Hg	8-hour	0.001	0.1
	24-hour	0.0006	0.024
Be	Annual	7.7×10^{-7}	0.0004
Fl	8-hour	0.019	25
H ₂ SO ₄	8-hour	2.65	10
	24-hour	1.53	2.4
As	Annual	1.3×10^{-6}	0.0002
Cadmium	Annual	2.8×10^{-6}	5.6×10^{-4}
Chromium	Annual	1.3×10^{-5}	8.5×10^{-5}

Table1. Significant and Net Emission Rates (Tons Per Year)

Pollutant	Significant Emission Rate	Existing Emissions	Proposed Maximum Emissions	Net Emission Increases	Applicable Pollutant (Yes/No)
CO	100	0	257.0	257.0	N
NO _x	40	0	281.4	281.4	Y
SO ₂	40	0	25.3	25.3	N
PM(PM10)	25	0	36.5	36.5	Y
O ₃ (VOC)	40	0	43.8	43.8	N
Lead	0.6	0	0.014	0.014	N
H ₂ SO ₄	7	0	3.8	3.8	N
Fluorides	3	0	0.009	0.009	N
Mercury	0.1	0	0.0009	0.0009	N
Be	0.0004	0	0.0007	0.0007	Y
As	NA	0	0.0011	0.0011	Y*

* Significant emission rate has not been promulgated for As, and until such time, any emissions by a new major source or any increase in emissions at an existing major source due to modification, are "significant".

Table 2. Maximum Air Quality Impacts for Comparison to the Significant Impact and De Minimus Ambient Levels.

Pollutant	Avg. Time	Predicted Impact (ug/m3)	Significant Impact Level (ug/m3)	De Minimus Level (ug/m3)
CO	1-hour	38.6	2000.0	NA
	8-hour	14.5	500.0	575.0
NO ₂ **	Annual	0.11	1.0	14.0
PM(PM10)	24-hour	4.16	5.0	10.0
	Annual	0.02	1.0	NA
VOC	Annual	43.8 TPY	NA	100 TPY
Be	24-hour	0.0005	NA	0.001
As	Annual	7.7 x 10 ⁻⁷	NA	NA

** Assume all NO_x are converted into NO₂.



Department of Environmental Protection

Lawton Chiles
Governor

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

Virginia B. Wetherell
Secretary

PERMITTEE:
Panda-Kathleen, L.P.
4100 Spring Valley,
Suite 1001
Dallas, Texas 75244

Permit Number: AC 53-251898
PSD-FL-216
Expiration Date: December 31, 1997
County: Polk
Latitude/Longitude: 28°02'10"N
82°01'52"W
Project: 115 MW Combined Cycle
Combustion Turbine

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Chapters 62-212 and 62-4, Florida Administrative Code (F.A.C.). The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and specifically described as follows:

For the installation of a combined cycle combustion turbine (CT) generator at the proposed facility (near Lakeland) in Polk County. This generator system will consist of either one nominal 75 megawatt (MW) Asea Brown Boveri (ABB) 11N1 or General Electric (GE) 7EA (or equivalent) CT (equipped with dry low-NO_x combustors for natural gas firing and water injection for fuel oil firing); and, one unfired and nominal 40 MW heat recovery steam generator (HRSG), which will be used to power a steam turbine. The ABB CT will have a maximum heat input at 59°F of 858 MMBtu/hr (natural gas) and 963 MMBtu/hr (oil). The GE CT will have a maximum heat input at 59°F of 890 MMBtu/hr (natural gas) and 971 MMBtu/hr (oil). The facility will supply steam to a distilled water plant at the same location. The facility will include a new 475,000 gallon fuel oil storage tank. The facility will be capable of producing a nominal 115 MW of electricity. The CT will be fired with natural gas and No. 2 low sulfur fuel oil with a sulfur content not to exceed 0.05 percent, by weight, as a back-up only.

The source/emission unit(s) shall be constructed in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachment is listed below:

1. Panda-Kathleen, L.P. application received June 6, 1994.
2. Panda-Kathleen, L.P. letter with attachments received September 19, 1994.

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Panda-Kathleen, L.P.

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GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "Permit Conditions" and are binding and enforceable pursuant to Sections 403.161, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute State recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefore; nor does it allow the permittee to cause pollution in contravention of F.S. and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

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7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at a reasonable time, access to the premises, where the permitted activity is located or conducted to:

- a. Have access to and copy any records that must be kept under the conditions of the permit;
- b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and,
- c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

- a. A description of and cause of non-compliance; and,
- b. The period of noncompliance, including dates and times; or, if not corrected, the anticipated time the non-compliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the non-compliance.

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the F.S. or Department rules, except where such use is prescribed by Sections 403.73 and 403.111, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and F.S. after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by F.S. or Department rules.

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11. This permit is transferable only upon Department approval in accordance with Rules 62-4.120 and 62-730.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. This permit also constitutes:

- (X) Determination of Best Available Control Technology (BACT)
- (X) Determination of Prevention of Significant Deterioration (PSD)
- (X) Compliance with New Source Performance Standards (NSPS)

14. The permittee shall comply with the following:

- a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
- b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
- c. Records of monitoring information shall include:
 - the date, exact place, and time of sampling or measurements;
 - the person responsible for performing the sampling or measurements;
 - the dates analyses were performed;
 - the person responsible for performing the analyses;
 - the analytical techniques or methods used; and,
 - the results of such analyses.

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15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

SPECIFIC CONDITIONS:

The construction and operation of the project shall be in accordance with all applicable provisions of Chapters 62-210 to 62-297, F.A.C. In addition to the foregoing, the project shall comply with the following conditions as indicated.

A. General Requirements

1. Pursuant to Rule 62-212.200(56), F.A.C., Potential to Emit (PTE), the maximum heat input to the ABB combustion turbine (CT) at an ambient temperature of 59°F shall neither exceed 858 MMBtu/hr while firing natural gas, nor 963 MMBtu/hr while firing fuel oil. The maximum heat rate to the GE CT at an ambient temperature of 59°F shall neither exceed 890 MMBtu/hr while firing natural gas, nor 971 MMBtu/hr while firing fuel oil. Heat input may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves or equations for correction to other temperatures shall be provided to the Department for review 90 days after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish heat input rates over a range of temperatures for the purpose of compliance determination.

2. Pursuant to Rule 62-212.200(56), PTE, the CT may operate continuously, i.e., 8,760 hrs/year.

3. Pursuant to Rule 62-212.200(56), F.A.C., only natural gas (NG) or No. 2 fuel oil is allowed to be fired in the CT. The maximum sulfur content of the No. 2 fuel oil shall not exceed 0.05 percent, by weight.

4. Pursuant to Rule 62-212.200(56), F.A.C., the maximum No. 2 fuel oil consumption allowed to be burned in the CT is 3,890,274 gallons per year, which is equivalent to 500 hours per year of operation at full-load. The No. 2 fuel oil is to be used as a back-up fuel only.

5. Pursuant to Rule 62-296.310(3), F.A.C., Unconfined Emissions of Particulate Matter (PM), the emissions of unconfined PM shall

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be minimized during the construction period by covering or watering dust generating areas.

B. Emission Limits

1. Pursuant to Rule 62-212.410, F.A.C., BACT, the maximum allowable emissions from the CT, when firing natural gas or No. 2 fuel oil at ISO conditions, shall not exceed:

ALLOWABLE EMISSIONS LIMITATIONS - ABB CT

<u>POLLUTANT</u>	<u>FUEL</u>	<u>BASIS</u>	<u>lbs/hr (a)</u>	<u>TPY (b)</u>
NO _x	Gas	15 ppmvd(e)	53	232
	Oil	42 ppmvd(c)	168	42
PM/PM ₁₀	Gas		5.4	24
	Oil(d)		33	8
Beryllium	Oil		0.0024	0.0007
Arsenic	Oil		0.004	0.001
Visible Emissions	Gas	10 percent opacity		
	Oil	20 percent opacity		

ALLOWABLE EMISSIONS LIMITATIONS - GE CT

<u>POLLUTANT</u>	<u>FUEL</u>	<u>BASIS</u>	<u>lbs/hr (a)</u>	<u>TPY (b)</u>
NO _x	Gas	15 ppmvd(e)	53	232
	Oil	42 ppmvd(c)	171	43
CO	Gas	25 ppmvd	54	237
	Oil	30 ppmvd	66	17
VOC	Gas	7 ppmvd	9	39
	Oil	7 ppmvd	10	3
PM/PM ₁₀	Gas		7.4	32
	Oil(d)		23	6
Beryllium	Oil		0.0024	0.0007
Arsenic	Oil		0.004	0.001
Visible Emissions	Gas	10 percent opacity		
	Oil	20 percent opacity		

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(a) Emission limitations in lbs/hr are blocked 24-hour averages (midnight to midnight). Pollutant emission rates may vary depending on ambient conditions and the CT characteristics. Manufacturer's curves for the emission rate correction to other temperatures at different loads shall be provided to the Department for review 90 days after selection of the CT. Subject to approval by the Department for technical validity applying sound engineering principles, the manufacturer's curves shall be used to establish pollutant emission rates over a range of temperatures for the purpose of compliance determination.

(b) Annual emission limits (TPY) for natural gas are based on the CT operating at full load for 8,760 hours per year (i.e., NO_x - 53 lbs/hr X 8,760 hrs/yr X 1 ton/2,000 lbs = 232 TPY). Annual emission limits (TPY) for fuel oil are based on full-load operation for a maximum of 500 hours per year for the CT (i.e., NO_x - 168 lbs/hr X 500 hrs/yr X 1 ton/2,000 lbs = 42 TPY).

(c) Fuel oil NO_x emissions are based on BACT at ISO conditions (ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure) and 15 percent oxygen. Compliance shall be determined through the initial and annual compliance tests. The annual compliance test will be required if the fuel oil operation is more than 400 hrs/yr.

(d) PM/PM₁₀ emission includes sulfuric acid mist.

(e) Natural gas NO_x emissions are based on BACT at ISO conditions (ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals pressure) and 15 percent O₂. Compliance will be determined through the initial and annual compliance tests required in Specific Condition C.1.

2. For the non-PSD pollutants, the allowable CT emissions shall not exceed at ISO conditions:

ALLOWABLE EMISSION LIMITATIONS - ABB CT

<u>POLLUTANT</u>	<u>FUEL</u>	<u>lbs/hr</u>	<u>TPY</u>
VOC	Gas(a)	4	18
	Oil(b,c)	22	6
CO	Gas(a)	12	53
	Oil(b,c)	20	5
SO ₂	Gas(a)	2.4	11
	Oil(b,c)	52	13

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ALLOWABLE EMISSION LIMITATIONS - GE CT

<u>POLLUTANT</u>	<u>FUEL</u>	<u>lbs/hr</u>	<u>TPY</u>
SO ₂	Gas(a)	2.5	11
	Oil(b,c)	52	13

(a) Annual emission limits (TPY) for natural gas are based on the CT operating at full-load for 8,760 hours per year (i.e., VOC - 4 lbs/hr x 8760 hrs/yr x 1 ton/2,000 lbs = 18 TPY for ABB CT).

(b) Annual emission limits (TPY) for fuel oil are based on full-load operation for a total of 500 hours per year for the CT (i.e., VOC - 22 lbs/hr x 500 hrs/yr x 1 ton/2,000 lbs = 6 TPY for ABB CT).

(c) The No. 2 fuel oil shall have a maximum sulfur content of 0.05 percent, by weight.

3. Panda-Kathleen cogeneration facility will install a dry low-NO_x combustors on the CT.

4. Within 6-months after the initial compliance test (estimated to be by June, 1997), Panda-Kathleen shall prepare and submit for the Department's review an engineering report containing, as a minimum, the following information:

The report shall include the NO_x concentration achieved during the initial compliance test. It shall also include hourly NO_x concentrations achieved during the 3-months subsequent to the initial compliance test and based on the continuous emissions monitoring (CEM) data. The CEM data shall meet the requirements of 40 CFR 60, Appendix F, quality assurance procedures.

The report shall also include results of the testing requirements of 40 CFR 60, Appendix F procedures, unit load (%) during the testing period (daily averages), and the actual CEM data strip chart for the 3-month period.

5. After submittal of the engineering report (estimated to be by June, 1997), the Department will make a determination and may revise the NO_x emission limits. If the data demonstrates that a NO_x concentration of less than 15 ppmvd @ 15% O₂ and ISO conditions is consistently achievable, the NO_x emission limit will be adjusted to 20 percent over the demonstrated concentration, rounded to the next higher number. The adjusted NO_x concentration cannot exceed 15 ppmvd @ O₂ and ISO conditions.

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6. Excess emissions from the CT resulting from start-up, shutdown, malfunction, or load change shall be acceptable providing (1) best operational practices to minimize emissions are adhered to and (2) the duration of excess emissions shall be minimized, but in no case exceed two hours in any 24-hour period unless specifically authorized by the Department for a longer duration. The permittee shall provide a general description of the procedures to be followed during periods of start up, shutdown, malfunction, or load change to ensure that the best operational practices to minimize emissions will be adhered to and the duration of any excess emissions will be minimized. The description should be submitted to the Department along with the initial compliance test data. The description may be updated as needed by submitting such update to the Department within thirty (30) days of implementation.

C. Performance Testing

1. Initial (I) compliance tests shall be performed on the CT using both fuels. Testing of emissions shall be conducted at 95-100% of the manufacturer's rated heat input based on the average ambient air temperature during the test. Compliance shall be determined using the turbine manufacturer's throughput rating for the average ambient temperature by multiplying the permitted emission limit at ISO conditions (59°F, 60% relative humidity and 101.3 kilopascals pressure) by the ratio of the tested heat input to the maximum heat input (MMBtu/hr) at ISO conditions. Annual (A) compliance tests shall be performed on the CT with the fuel(s) used for more than 400 hours in the preceding 12-month period. Tests at permit renewal (R) shall be performed on non-PSD pollutants. Tests shall be conducted using EPA reference methods in accordance with 40 CFR 60, Appendix A, as adopted by reference in Chapter 62-297, F.A.C.:

- a. Reference Method 5B for PM (I, A, for oil only) for either ABB or GE CT.
- b. Reference Method 9 for VE (I, A) for either ABB or GE CT.
- c. Reference Method 10 for CO (I, R) for ABB CT.
- d. Reference Method 10 for CO (I, A) for GE CT.
- e. Reference Method 20 for NOx (I, A) for either ABB or GE CT.
- f. Reference Method 18 for VOC (I, R) for ABB CT.

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- g. Reference Method 18 for VOC (I, A) for GE CT.
- h. Trace elements of Beryllium (Be) and Arsenic (As) shall be tested (I, R for oil only) for either ABB or GE CT using EMTIC Interim Test Methods. As an alternative, Reference Method 104 for Be may be used; or, Be and As may be determined from fuel analysis using either EPA SW-846 3040/7090 or 3040/7091, which are the extraction/analytical test methods contained in EPA Publication SW-846, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", 3rd Edition, Test Method 7090 or 7091.
- i. ASTM D4294 (or equivalent) for sulfur content of distillate oil (I, A), which can be used for determining SO₂ emissions for either ABB or GE CT.
- j. ASTM D1072-80, D3031-81, D4084-82, or D3246-81 (or equivalent) for sulfur content of natural gas (I, and R if deemed necessary by DEP) for either ABB or GE CT.
- k. No other method may be used for compliance testing without approval from DARM, in writing. In some cases other methods may be approved.

2. The maximum sulfur content of the No. 2 fuel oil shall not exceed 0.05 percent, by weight. Compliance shall be demonstrated in accordance with the requirements of 40 CFR 60.334. Testing for sulfur content of the fuel oil in the storage tanks shall be conducted upon each occasion that fuel is transferred to the storage tanks. Testing for fuel oil lower heating value shall also be conducted on the same schedule.

D. Monitoring Requirements

For the combined cycle unit, the permittee shall install, operate, and maintain a continuous emission monitoring system (CEMS) to monitor nitrogen oxides in accordance with 40 CFR 60, Appendix F, and, if necessary, a diluent gas (CO₂ or O₂). The Federal Acid Rain Program requirements of 40 CFR 75 shall apply if those requirements become effective for this source/emissions unit.

1. Each CEMS shall meet performance specifications of 40 CFR 60, Appendix B.

2. CEMS data shall be recorded and reported in accordance with Rule 62-297.500, F.A.C., 40 CFR 60 and 40 CFR 75, if it becomes applicable. The record shall include periods of start up, shutdown, and malfunction.

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3. A malfunction means any sudden and unavoidable failure of air pollution control equipment or process equipment to operate in a normal or usual manner. Failures that are caused entirely or in part by poor maintenance, careless operation, or any other preventable upset condition or preventable equipment breakdown shall not be considered malfunctions.

4. The procedures under 40 CFR 60.13 shall be followed for installation, evaluation, and operation of all CEMS. 40 CFR 75 shall apply if this source is or becomes subject to the Federal Acid Rain Program.

5. For purposes of the reports required under this permit, excess emissions are defined as any calculated average emission rate, as determined pursuant to Specific Condition B.6 herein, which exceeds the applicable emission limits in Specific Condition B.1.

E. Notification, Reporting and Recordkeeping

1. To determine compliance with the natural gas and fuel oil firing heat input limitation, the permittee shall maintain daily records of natural gas and fuel oil consumption for the turbine and the heating value for each fuel. All records shall be maintained for a minimum of two years after the date of each record and shall be made available to representatives of the Department upon request.

2. The project shall comply with all the applicable requirements of Chapter 62-297, F.A.C., 40 CFR 60, Subpart A. The requirements shall include:

a. 40 CFR 60.7(a)(1) - By postmarking or delivering notification of the start of construction no more than 30 days after such date.

b. 40 CFR 60.7(a)(2) - By postmarking or delivering notification of the anticipated date of the initial start up of the CT not less than 30 days prior to such date.

c. 40 CFR 60.7(a)(3) - By postmarking or delivering notification of the actual start up of the turbine within 15 days after such date.

d. 40 CFR 60.7(a)(5) - By postmarking or delivering notification of the date for demonstrating the CEMS performance, no less than 30 days prior to such date.

e. 40 CFR 60.7(a)(6) - By postmarking or delivering notification of the anticipated date for conducting the opacity observations no less than 30 days prior to such date.

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f. 40 CFR 60.7(b) - By initiating a recordkeeping system to record the occurrence and duration of any start up, shutdown or malfunction of the turbine, of any malfunction of the air pollution control equipment, and the periods when the CEMS is inoperable.

g. 40 CFR 60.7(c) - By postmarking or delivering a quarterly excess emissions and monitoring system performance report within 30 days after the end of each calendar quarter. This report shall contain the information specified in 40 CFR 60.7(c) and (d).

h. 40 CFR 60.8(a) - By conducting all performance tests within 60 days after achieving the maximum turbine firing rates, but not more than 180 days after the initial start up of the CT.

i. 40 CFR 60.8(d) - By postmarking or delivering notification of the date of each performance test required by this permit at least 30 days prior to the test date; and,

j. Rule 62-297.345, F.A.C. - By providing stack sampling facilities for the turbine.

k. All notifications and reports required by this Specific Condition shall be submitted to the Department's Air Program of the Southwest District office. Performance test results shall be submitted within 45 days of completion of such test.

3. The following information shall be submitted to the Department's Bureau of Air Regulation within 90 days after selection of each, respectively:

a. Description of the final selection of the turbine for installation at the facility. Descriptions shall include the specific make and model numbers, any changes in the proposed method of operation, fuels, emissions or equipment.

b. Description of the CEMS selected. Description shall include the type of sensors, the manufacturer and model numbers of the equipment.

4. The following protocols shall be submitted to the Department's Air Program of the Southwest District office for approval;

a. CEMS Protocol - Within 60 days after selection of the CEMS, but prior to the initial startup, a CEMS protocol describing

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the system, its installation, operating and maintenance characteristics and requirements. The protocol shall meet the requirements of 40 CFR 60.13, Appendix B and Appendix F.

b. Performance Test Protocol - At least 90 days prior to conducting the initial performance tests required by this permit, the permittee shall submit to the Department's Air Program of the Southwest District office a protocol outlining the procedures to be followed and the test methods that will be used to verify compliance with the conditions of this permit. The Department shall approve the testing protocol provided that it meets the requirements of this permit.

F. Modifications

The permittee shall give written notification to the Department when there is any modification to this facility. This notice shall be submitted timely and in advance of any critical date involved to allow sufficient time for review, discussion, and revision of plans, if necessary. Such notice shall include, but not be limited to, information describing the precise nature of the change; modifications to any emission control system; production capacity of the facility before and after the change; and, the anticipated completion date of the change.

G. No. 2 Fuel Oil Storage Tank

The permittee shall be in compliance with the monitoring requirements specified in 40 CFR 60.116b(b), which requires maintaining a record of the dimensions of the storage vessel and an analysis showing the capacity of the storage vessel.

H. Additional General Conditions

1. Pursuant to Rule 62-4.090, F.A.C., the permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the Department's Bureau of Air Regulation prior to 60 days before the expiration of the permit.

2. Pursuant to Rules 62-4.055 and 62-4.220, F.A.C., an application for an operation permit must be submitted to the Department's Southwest District office at least 90 days prior to the expiration date of this construction permit. To properly apply for an operation permit, the applicant shall submit the appropriate

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application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit.

Issued this _____ day
of _____, 1994

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Virginia B. Wetherell, Secretary

Best Available Control Technology (BACT) Determination
Panda-Kathleen, L.P.
Polk County
PSD-FL-216

The applicant proposes to install a combined cycle combustion turbine (CT) generator at its facility (near Lakeland) in Polk County. This generator system will consist of either one nominal 75 megawatt (MW) Asea Brown Boveri (ABB) 11N1 or General Electric (GE) 7EA (or equivalent) CT and one unfired and nominal 40 MW heat recovery steam generator (HRSG), which will be used to power a steam turbine. The facility will include a new 475,000 gallon fuel oil storage tank. The facility will be capable of producing a nominal 115 MW of electricity. The CT will be fired with natural gas and No. 2 low sulfur fuel oil with a sulfur content not to exceed 0.05 percent, by weight, as a backup only.

Construction and startup of the proposed 115 MW CC unit in Polk County will occur over a period of eighteen months. The CC unit will begin operation by July 1, 1996.

The applicant has indicated that the maximum annual air pollutant emission rates, based on 100 percent capacity factor and type of fuel fired, will be:

Pollutant	Emissions (TPY)				Significant Emission Rate (TPY)	Subject to PSD review?
	CT1		CT2			
	Oil	Gas	Oil	Gas		
NO _x	42	219	46	235.4	40	Yes
SO ₂	13	10	14.2	11.1	40	No
PM/PM ₁₀	8.25	22	5.9	30.6	25/15	Yes
CO	5	50	17.5	239.5	100	Yes
VOC	5.5	17	2.5	41.3	40	Yes
H ₂ SO ₄	2	1.5	2.2	1.7	7	No
Arsenic	0.0011	neg.	0.0011	neg.	Any	Yes
Beryllium	0.0007	neg.	0.0007	neg.	0.0004	Yes
Mercury	0.0009	neg.	0.0009	neg.	0.1	No
Lead	0.01	neg.	0.01	neg.	0.6	No

1 - ABB CT with a maximum of 500 hours on No. 2 fuel oil; and, up to 8760 hours on natural gas.

2 - GE CT with a maximum of 500 hours on No. 2 fuel oil; and, up to 8760 hours on natural gas.

Rule 62-212.400, Florida Administrative Code (F.A.C.), Stationary Source Preconstruction Review, requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in the previous table.

Date of Receipt of a BACT Application:
June 6, 1994

Date Application Complete:
September 19, 1994

BACT Determination Requested by the Applicant:

Combined Cycle Combustion Turbine

<u>Pollutant</u>	<u>Fuel</u>	
	<u>Natural Gas</u>	<u>Fuel Oil</u>
NO _x	15 ppmvd @ 15% O ₂ and ISO conditions; Dry Low-NO _x Burners	42 ppmvd @ 15% O ₂ and ISO conditions; Water Injection and Limited Fuel Oil Operation
CO	25 ppmvd Combustion Control	30 ppmvd Combustion Control
VOC	7 ppmvd Combustion Control	7 ppmvd Combustion Control
PM/PM ₁₀	Combustion Control	Combustion Control Limited Fuel Oil Operation
Beryllium	Combustion Control	Combustion Control Limited Fuel Oil Operation
Inorganic Arsenic	Combustion Control	Combustion Control Limited Fuel Oil Operation

BACT Determination Procedure

In accordance with Rule 62-212.410, F.A.C., Best Available Control Technology Review, Stationary Source - Preconstruction Review, the BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department, on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through

application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- (a) Any Environmental Protection Agency determination of Best Available Control Technology pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).
- (b) All scientific, engineering, and technical material and other information available to the Department.
- (c) The emission limiting standards or BACT determinations of any other state.
- (d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objection.

The air pollutant emissions from combined cycle power plants can be grouped into categories based upon what control equipment and techniques are available to control emissions from these facilities. Using this approach, the emissions can be classified as follows:

- o Combustion Products (e.g., particulate matter and trace metals). Controlled generally by good combustion of clean fuels.
- o Products of Incomplete Combustion (e.g., CO and VOCs). Control is largely achieved by proper combustion techniques.
- o Acid Gases (e.g., SO₂, NO_x). Controlled generally by gaseous control devices and fuel quality.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., particulates, sulfur dioxide, fluorides, sulfuric acid mist, etc.), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

BACT POLLUTANT ANALYSIS

COMBUSTION PRODUCTS

Particulate Matter (PM/PM₁₀)

The design of the CT system ensures that particulate matter emissions will be minimized by combustion control and the use of clean fuels. The particulate matter emissions from the combustion turbine, when burning natural gas and No. 2 fuel oil, will not exceed 5.4 lbs/hr (gas) and 33 lbs/hr (oil) for the ABB 11N1 (or equivalent) at 100% load; and, the emissions are corrected to 15% O₂ and ISO conditions (ISO standard day conditions means 288 degrees Kelvin, 60 percent relative humidity and 101.3 kilopascals).

Beryllium and Arsenic (Be, As)

The Department agrees with the applicant's rationale that there are no feasible methods to control beryllium, inorganic arsenic and other trace pollutants, except by requiring good quality fuel. The limit of sulfur to 0.05%, by weight, is the requirement that assures good quality fuel.

PRODUCTS OF INCOMPLETE COMBUSTION

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

The emissions of carbon monoxide exceed the PSD significant emission rate of 100 TPY with the GE 7EA CT. The applicant has indicated that the carbon monoxide emissions from the proposed

combined cycle turbines with dry low-NO_x combustors are 25 ppmvd at 15 % O₂ for natural gas firing and 30 ppmvd at 15 % O₂ for fuel oil firing and water injection. Volatile organic compound emissions have been based on exhaust concentrations of 7 ppmvd for natural gas and fuel oil firing.

The majority of BACT emissions limitations have been based on combustion controls for carbon monoxide and volatile organic compounds minimization. Additional control is achievable through the use of catalytic oxidation. Catalytic oxidation is a post-combustion control that has been employed in CO nonattainment areas where regulations have required CO emission levels to be less than those associated with wet injection. These installations have been required to use LAER technology and typically have CO limits in the 10-ppm range (corrected to dry conditions).

In an oxidation catalyst control system, CO emissions are reduced by allowing unburned CO to react with oxygen at the surface of a precious metal catalyst such as platinum. Combustion of CO starts at about 300°F, with efficiencies above 90 percent occurring at temperatures above 600°F. Catalytic oxidation occurs at temperatures 50 percent lower than that of thermal oxidation, which reduces the amount of thermal energy required. For CT/HRSG combinations, the oxidation catalyst can be located directly after the CT or in the HRSG. Catalyst size depends upon the exhaust flow, temperature, and desired efficiency.

The application of oxidation catalyst is not technically feasible for gas turbines fired with fuel oil due to the oxidation of sulfur compounds and excessive formation of H₂SO₄ mist emissions. Catalytic oxidation has not been demonstrated on a continuous basis when using fuel oil.

Use of oxidation catalyst technology would be feasible for a natural gas-fired unit; however, the cost effectiveness of \$5,297 per ton of CO/VOC removed for the GE 7EA unit would have an economic impact on this project.

ACID GASES

Nitrogen Oxides (NO_x)

The emissions of nitrogen oxides represent a significant portion of the total emissions generated by this project and need to be controlled, if deemed appropriate. As such, the applicant presented an extensive analysis of the different available technologies for NO_x control.

The applicant provided information on two different CTs by two different vendors, the GE Model 7EA and the ABB Model 11N1. The vendors indicated to the applicant that the NO_x emission limit achievable by those CTs were 9 ppmvd and 15 ppmvd at ISO conditions for the GE 7EA and ABB 11N1, respectively.

The applicant stated that BACT for nitrogen oxides will be met by using dry low-NO_x combustors to limit emissions when burning natural gas and water injection to limit emissions when burning fuel oil.

A review of the EPA's BACT/LAER Clearinghouse indicates that the lowest NO_x emission limit established to date for a combustion turbine is 6 ppmvd at 15% oxygen. This level of control was accomplished through the use of water injection and a selective catalytic reduction (SCR) system.

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% reduction of NO_x with a new catalyst. As the catalyst ages, the NO_x reduction efficiency while holding ammonia slip emissions constant will decrease.

The effect of exhaust gas temperature on NO_x reduction depends on the specific catalyst formulation and reactor design. Generally, SCR units can be designed to achieve effective NO_x control over a 100-300°F operating window within the bounds of 450-800°F. The preferable operating window is within the bounds of 600-750°F for effective NO_x control.

Most commercial SCR systems operate over a temperature range of about 600-750°F. At levels above and below this window, the specific catalyst formulation will not be effective and NO_x reduction will decrease. Operating at high temperatures can permanently damage the catalyst through sintering of surfaces. Increased water vapor content in the exhaust gas (as would result from water or steam injection in the gas turbine combustor) can shift the operating temperature window of the SCR reactor to slightly higher levels.

As stated by the applicant, the exhaust temperature of the proposed combined cycle CT is approximately 1000°F. At temperatures of 1000°F and above, the zeolite catalyst (reported to

operate within 600-950°F) will be irreparably damaged. However, catalyst can be located in the appropriate temperature range in the HRSG, but the applicant has stated that effective SCR operation will be difficult to maintain under significant load and ambient temperature variations. In this case, application of an SCR system appears to be technically feasible.

Although technically feasible, the applicant has also rejected using SCR on the combined cycle unit because of economic, energy, and environmental impacts. The applicant has identified the following limitations:

- a) Reduced power output.
- b) Emissions of unreacted ammonia (slip).
- c) Increased sulfuric acid mist emissions.
- d) Disposal of hazardous waste generated (spent catalyst).
- e) Ammonium bisulfate and ammonium sulfate particulate matter emissions (ammonium salts) due to the reaction of NH_3 with SO_3 present in the exhaust gases.
- f) Cost effectiveness for the application of SCR technology to the project was considered to be \$19,794 and \$9,012 per ton of NO_x removed when compared to the use of dry low- NO_x combustors for the GE 7EA and ABB 11N1 CTs, respectively.

Since SCR has been determined to be BACT for several combined cycle facilities, the EPA has clearly stated that there must be unique circumstances to consider the rejection of such control on the basis of economics.

In a recent letter from EPA Region IV to the Department regarding the permitting of a combined cycle facility (Tropicana Products, Inc.), the following statement was made:

"In order to reject a control option on the basis of economic considerations, the applicant must show why the costs associated with the control are significantly higher for this specific project than for other similar projects that have installed this control system or in general for controlling the pollutant."

For fuel oil firing, the cost associated with controlling NO_x emissions must take into account the potential operating problems that can occur with using SCR in the oil firing mode.

With the use of SCR on a combined cycle project, the formation of ammonium bisulfate can be a problem. In the SCR process, the injected ammonia and the fuel sulfur react to form the ammonium bisulfate, which leads to operational problems (i.e., the plugging of the tubes of the HRSG). In previous BACT determinations, SCR has been judged to be technically infeasible for oil firing.

The latest information available now indicates that SCR can be used for oil firing provided that adjustments are made in the ammonia to NO_x injection ratio. For natural gas firing operation, NO_x emissions can be controlled with up to a 90 percent removal efficiency using a 1 to 1 or greater ammonia to NO_x injection ratio. By lowering the injection ratio for oil firing, testing has indicated that NO_x can be controlled with efficiencies ranging from 60 to approximately 75 percent. When the injection ratio is lowered, there is not a problem with ammonium bisulfate formation since essentially all of the ammonia is able to react with the nitrogen oxides present in the combustion gases. Based on this strategy SCR has been both proposed and established as BACT for oil fired combined cycle facilities with NO_x emission limits ranging from 11.7 to 25 ppmvd, depending on the efficiency of control established.

The applicant has indicated that the total levelized annual operating cost to install SCR for this project, at 100 percent capacity factor and burning natural gas, is \$1,456,303 for the GE 7EA CT and \$1,444,864 for the ABB 11N1 CT. Taking into consideration the total annual cost, a cost/benefit analysis of using SCR can now be developed.

For the GE 7EA combined cycle combustion turbine and based on the information supplied by the applicant, it is estimated that the maximum annual NO_x emissions using dry low NO_x combustors will be 174.9 tons/year (assuming 8,260 and 500 hours of operation per year while firing natural gas and fuel oil, respectively, and at 15% O₂ and ISO conditions; and, 100% load). Assuming that SCR would reduce the NO_x emissions from 9 ppmvd to 6 ppmvd when firing natural gas and from 42 ppmvd to 13 ppmvd when firing fuel oil, 101.3 tons of NO_x would be emitted annually. When this reduction of 73.6 TPY, as compared with the application of dry low-NO_x combustors, is taken into consideration with the total levelized annual operating cost of \$1,456,303, the cost per ton of controlling NO_x is \$19,794. This calculated cost is higher than has previously been approved as BACT.

For the ABB 11N1 combined cycle combustion turbine and based on the information supplied by the applicant, it is estimated that the maximum annual NO_x emissions using dry low NO_x combustors will be 260.9 tons/year [assuming 8260 and 500 hours of operation per year while firing natural gas and fuel oil, respectively, and at 15% O₂ and ISO conditions; and, 100% load]. Assuming that SCR would reduce the NO_x emissions from 15 ppmvd to 6 ppmvd when firing natural gas and from 42 ppmvd to 13 ppmvd when firing fuel oil, 100.6 tons of NO_x would be emitted annually. When this reduction of 160.3 TPY, as compared with the application of dry low-NO_x combustors, is taken into consideration with the total levelized annual operating cost of \$1,444,864, the cost per ton of controlling NO_x is \$9,012. This calculated cost is higher than has previously been approved as BACT.

BACT Determination by DEP:

Combined Cycle Combustion Turbines

NO_x Control

The applicant presented information on two different combustion turbines. The vendors claimed that one of them will be able to achieve 9 ppmvd (GE 7EA) and the other one will be able to achieve 15 ppmvd (ABB 11N1). A BACT analysis, by its terms, should consider those technologies that are available and have demonstrated the ability to control a particular pollutant. The Department has, in the past, permitted an ABB model combustion turbine with a NO_x emission limit of 15 ppmvd at 15% O₂ and ISO conditions (Orlando Cogen Limited; PSD-FL-184; AC 48-206720). The initial compliance test demonstrated that the ABB CT is capable of achieving NO_x emissions of less than 15 ppmvd.

The GE Model 7EA CT has not yet been applied to (or permitted for) full scale operations, thus lacking commercial operating experience to validate the 9 ppmvd at 15% O₂ and ISO conditions guarantee. Considering the uncertainty regarding the basis of the GE manufacturer guarantees and the lack of commercial operating experience at the 9 ppmvd emission level, the Department has determined that a NO_x emission limit of 15 ppmvd (53 lbs/hr) @ 15% O₂ and ISO conditions, for continuous compliance basis [on a blocked 24-hour average (midnight to midnight)], is valid. Additionally, the NO_x emission limit of 15 ppmvd may be lowered by the Department based on the data generated by the applicant, as outlined in Specific Conditions B4 and B5 of the permit. Based on

the initial compliance test and 3 months of continuous emissions monitoring data, the Department will, if less than 15 ppmvd is demonstrated, revise the NO_x emission limit to 20 percent over the demonstrated concentration rounded off to the next higher ppm, not to exceed 15 ppmvd @ 15% O₂ and ISO conditions.

The information that the applicant presented and the Department's calculations indicate that the cost per ton of controlling NO_x for the ABB 11N1 CT to be \$9,012, which is significantly higher when compared to other BACT determinations that require SCR. Based on the information presented by the applicant, the Department believes that the use of SCR for NO_x control is not justifiable as BACT at this time.

A review of the permitting activities for combined cycle proposals across the nation indicates that SCR has been required and most recently proposed for installations with a variety of operating conditions (i.e., natural gas, fuel oil, and various capacity factors). Although the cost and other concerns expressed by the applicant are valid, the Department, in this case, is willing to accept water injection and dry low-NO_x burner design as BACT for this project.

VOC and CO Control

The Department is in agreement with the applicant's proposal of combustor design and good operating practices as BACT for CO and VOCs for this project.

Other Emissions Control

The emission limitations for PM and PM₁₀, Be, and As are based on previous BACT determinations for similar facilities. Although the emissions of these pollutants could be controlled by particulate matter control devices, such as a baghouse or scrubber, the amount of emission reductions would not warrant the added expense. Therefore, the Department does not believe that the BACT determination would be affected by the emissions of these pollutants. The Department accepts the applicant's proposed control of limiting the inherent quality of the fuel for these pollutants as BACT for the combined cycle unit.

The emission limits for the Panda-Kathleen, L.P. project of the combined cycle unit for 115 MW are thereby established as follows at ISO conditions:

115 MW COMBINED CYCLE COMBUSTION TURBINES

Pollutant	Emission Standards/Limitations		Method of Control
	Oil(a)	Gas(b)	
NO _x	42 ppmvd @ 15% O ₂	15 ppmvd @ 15% O ₂	Water Injection on oil Dry Low NO _x Combustor on gas
CO	30 ppmvd @ 15% O ₂	25 ppmvd @ 15% O ₂	Combustion controls Limited fuel oil operation
VOC	7 ppmvd	7 ppmvd	Combustion controls
PM & PM ₁₀	33 lbs/hr	5.4 lbs/hr	Combustion controls
Be	2.5 x 10 ⁻⁶ lbs/MMBtu		Fuel Quality
As	4.2 x 10 ⁻⁶ lbs/MMBtu		Fuel Quality

- (a) No. 2 fuel oil with a maximum of 0.05% sulfur, by weight.
(b) Maximum of hours of operation for natural gas/fuel oil are 8760/500 hours per year.

Details of the Analysis May be Obtained by Contacting:

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Recommended by:

Approved by:

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

Virginia B. Wetherell, Secretary
Dept. of Environmental Protection

_____, 1994
Date

_____, 1994
Date