Florida Department of Environmental Regulation

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

Bob Martinez, Governor | Dale Twachtmann, Secretary | John Shearer, Assistant Secretary

May 4, 1990

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Ms. Patsy Y. Baynard
Florida Power Corporation
Post Office Box 14042
St. Petersburg, Florida 33233

Dear Ms. Baynard:

Attached is one copy of the Revised Technical Evaluation and Preliminary Determination and proposed permit for Florida Power Corporation to construct helper cooling towers at the Crystal River Plant in Citrus County, Florida.

Please submit any written comments you wish to have considered concerning the Department's proposed action to Mr. Barry Andrews of the Bureau of Air Regulation.

Sincerely,

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

CHF/kt

Attachments

cc: B. Thomas, SW District
W. Aronson, EPA
C. Shaver, NPS
G. Christensen, PE, Black & Veatch
D. Buff, KBN

P 938 762 864

RECEIPT FOR CERTIFIED MAIL

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

Sent to: Patsy Bayard	
Street and No. FPC - P.O. BOX 14042	
P.O., State and ZIP Code St. Pete, Fl	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 5-7-90 AC 09-162037 PSD-FI-139	

PS Form 3800, June 1985

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

3. Article Addressed to:
Mr. Patsy D. Bayard
Fla Power Corp.
P.O. BOX 14042
St. Petersburg, Fl
33733

4. Article Number
P 938 762 864

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PS Form 38[illegible] U.S.G.P.O. [illegible] RN RECEIPT

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of
Application for Permit by:

Florida Power Corporation
Post Office Box 14042
St. Petersburg, Florida 33233

DER File No. AC 09-162037
PSD-FL-139

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit (copy attached) for the proposed project as detailed in the application specified above. The Department is issuing this Intent to Issue for the reasons stated in the attached Revised Technical Evaluation and Preliminary Determination.

The applicant, Florida Power Corporation, applied on March 9, 1989, to the Department of Environmental Regulation for a permit to construct four mechanical draft helper cooling towers at the Crystal River Plant in Citrus County, Florida.

The Department has permitting jurisdiction under Chapter 403, Florida Statutes, and Florida Administrative Code Rules 17-2 and 17-4. The project is not exempt from permitting procedures. The Department has determined that an air construction permit is required for the proposed work.

Pursuant to Section 403.815, F.S. and DER Rule 17-103.150, 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, at the address specified 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, Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. 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 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, Florida Statutes.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by Petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office in 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 REGULATION

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

Copies furnished to:
B. Thomas, SW District
W. Aronson, EPA
C. Shaver, NPS
G. Christensen, PE, Black & Veatch
D. Buff, KBN

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF INTENT TO ISSUE and all copies were mailed before the close of business on 5-7-90.

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Kimi Tober
Clerk

5-7-90
Date

State of Florida
Department of Environmental Regulation
Notice of Intent to Issue

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit to Florida Power Corporation, Post Office Box 14042, St. Petersburg, Florida 33233, to construct four mechanical draft helper cooling towers at the Crystal River Plant in Citrus County, Florida.

In accordance with Rule 17-2.500 of the Florida Administrative Code, a Prevention of Significant Deterioration (PSD) Review was required for the project. The pollutants total suspended particulate (TSP) and particulate matter less than 10 microns (PM10) were evaluated. The maximum TSP emissions from the two proposed saltwater helper cooling tower design options are expected to be 428 lbs/hr and 925 tons per year. A determination of Best Available Control Technology (BACT) for emissions of particulate matter was required. A discussion of how the BACT was determined is included in the Department's preliminary determination.

The maximum degree of TSP increment consumed is as follows:

Area	24-hr ug/m^3 Impact	Allowable	Percent Consumed	Annual ug/m^3 Impact	Allowable	Percent Consumed
Class I	2	10	23	0.2	5	4
Class II	36	37	76	5.3	19	28

The maximum predicted pollutant concentrations from the helper cooling towers are projected to be less than the National Ambient Air Quality Standards (NAAQS). The NAAQS are levels set by the EPA which identify the ambient concentration necessary to protect human health and welfare with an adequate margin of safety. 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. 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 fourteen (14) days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

The Petition shall contain the following information;

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by Petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

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

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

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

Dept. of Environmental Regulation
Southwest District Office
4520 Oak Fair Blvd.
Tampa, Florida 33610-7347

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

Revised
Technical Evaluation
and
Preliminary Determination

Florida Power Corporation
Crystal River, Citrus County, Florida

Helper Cooling Towers for Units 1, 2, and 3

Permit Numbers: AC 09-162037
PSD-FL-139

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

March 28, 1990

I. Application

A. Applicant

Florida Power Corporation
P. O. Box 14042
St. Petersburg, Florida 33233

B. Project and Location

The applicant, Florida Power Corporation (FPC), proposes to construct four mechanical draft helper cooling towers for power generating units 1, 2, and 3, to reduce the discharge water temperature at the existing Crystal River Plant in Citrus County, Florida. The UTM coordinates of the facility are Zone 17, 333.8 km East and 3204.5 km North.

C. Facility Category

The Crystal River Plant is a major facility in accordance with Chapter 17-2 of the Florida Administrative Code (F.A.C.). The proposed project will be a major modification to a major facility. The Standard Industrial Classification (SIC) Code for this plant is Industry No. 4931, Electric Services. The NEDs Source Classification Code (SCC) for cooling towers is 3-12-999-99 Miscellaneous Machinery (tons processed).

FPC's application was received on March 9, 1989, and was deemed complete on February 6, 1990.

II. Project Description

In order to comply with the NPDES permit for the plant's discharge water temperature, FPC will construct mechanical draft helper cooling towers. Two cooling tower designs have been proposed. The difference between the two designs is that the second design has one additional fan/cell per tower, and therefore has the ability to cool an additional 48 gallons per minute (gpm) of salt water. The two design options involve four towers with 9/10 cells each and a total of 36/40 fans will cool about 687,000/735,000 gpm saltwater from 102.4°F to 91°F so as to maintain the plant's discharge water temperature at 96.5°F (3-hour average), or 97°F maximum. Drift from the cooling towers is proposed to be controlled by Munter's high efficiency drift eliminators.

When the sea (salt) water is sprayed through the tower, the fan induced air flow causes evaporative cooling. Water vapor, salt water droplets, and salt particles are emitted from the towers. It should be noted that saltwater spray is also generated by natural wave action in the nearby Gulf of Mexico. The drift eliminators are expected to be 99.8% efficient. However, the key problem in the evaluation of this project is the determination of the quantity of emissions from the towers. Several test methods have been evaluated.

Sensitive paper is currently used for testing natural draft cooling towers. However, this method is not appropriate for detecting the smaller particle sizes expected from the mechanical draft cooling towers. A modified EPA Method 13A has been used in testing for chromium emissions, and recently for salt water drift emissions. The results from these limited tests showed alarmingly large scatter, thus questioning its validity. Although EPA Method 5 has not been used for testing cooling tower emissions, it is widely used in determining particulate emissions from other sources and may be an appropriate method in this case also. The most widely used method currently in use, adopted by the Cooling Tower Institute, is an isokinetic method using glass bead packing. This method has not been adopted by DER. Recently, extensive testing was undertaken by FPC to compare the various test methods. EPA Method 5 was determined to be more consistent and conservative than the other methods.

For the purposes of determining the emissions from the proposed mechanical draft cooling towers, the Department will accept EPA Method 5, or any other equivalent method approved by DER. The total suspended (TSP) particulate matter emissions from the two cooling tower options are estimated to be 400/428 lbs/hr and 864/925 tons per year (TPY). The emissions of particulates less than 10 micrometers in diameter (PM10), are expected to be 50% of the TSP emissions.

The applicant has also provided a list of fugitive dust emission sources at the facility. Emissions estimates shown in the revised application are based on AP-42 emission factors. Fugitive dust emissions which were not included previously in increment consumption analysis have been included in this evaluation. The total fugitive TSP and PM10 emissions from the facility are estimated to be about 54 and 34 tons per year, respectively.

II. Rule Applicability

The proposed project will emit particulate matter and is subject to a preconstruction review in accordance with Chapters 17-2 and 17-4, F.A.C. and Chapter 403 of the Florida Statutes.

The proposed project is located in Citrus County, an attainment area for all the criteria pollutants, in accordance with F.A.C. Rule 17-2.420.

The proposed project is within 100 km of the Chassahowitzka National Wilderness Area, designated as a Class I area in accordance with F.A.C. Rule 17-2.440.

The proposed project is subject to Prevention of Significant Deterioration (PSD) Review Requirements in accordance with F.A.C. Rule 17-2.500(2)(d)4.

The proposed project is subject to a Best Available Control Technology (BACT) determination in accordance with F.A.C. Rule 17-2.630.

The proposed project is subject to emission testing and reporting requirements, in accordance with F.A.C. Rule 17-2.700. Emission testing will be conducted using EPA Method 5, or any other equivalent method approved by the DER.

IV. Source Impact Analysis

A. Emission Limitations

In accordance with the attached BACT determination, the emissions of (drift) particulates from the helper cooling towers will be restricted to 0.004% of the water circulation rate. For the two cooling tower options, at a rate of 687,000/735,000 gpm, the allowable particulate emission rate will be 400/428 lbs/hr and 864/925 TPY, while operating for 4,320 hrs/year (about 6 months per year).

B. Air Quality Impact Analysis

Florida Power Corporation (FPC) is proposing to construct helper cooling towers for Units 1, 2, and 3 at their Crystal River power plant. Two separate designs have been proposed and evaluated. The firstdesign, Case 1, includes a row of four mechanical draft towers with nine fans per tower. The second design, Case 2, has four towers with 10 fans per tower. Table 1 shows the specifications for these designs. The four towers proposed will process up to 735,000 gallons per minute of heated cooling water taken from the Gulf of Mexico. The salt contained in this cooling water, as it's released in the evaporation plume, is a source of particulate matter (PM).

The proposed helper cooling towers are expected to operate a maximum of 180 days per year, centering on the summer months. They will be used on an as-needed basis to assure that the outflow water temperature remains at or below the 96.5°F limit contained in the NPDES permit.

The maximum particulate matter emissions from these helper cooling towers are estimated to be 925 tons per year. It is further estimated that 50 percent of these emissions (463 tons per year) are of particulates less than or equal to 10 micrometers in diameter (PM10). Both the total particulates and the PM10 emissions are greater than the PSD-significant emission levels for applicability to the Prevention of Significant Deterioration (PSD) rules and regulations contained in Rule 17-2.500 of the Florida Administrative Code. The air quality 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, visibility, and growth-related air quality impacts; and,
- A "Good Engineering Practice" (GEP) stack height determination.

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

Based on these required analyses, the Department has reasonable assurance that the proposed facility, as described in this permit, will not cause or contribute to a violation of any PSD increment or ambient air quality standard.

Analysis of Existing Air Quality

Preconstruction ambient air quality monitoring may be required for all pollutants subject to PSD review. In general, one year of quality assured data using an EPA reference, or the equivalent, monitor must be submitted. Sometimes less than one year of data, but not less than four months may be accepted when Department approval is given.

An exemption to the monitoring requirement can be obtained if the maximum air quality impact, as determined through air quality modeling, is less than a pollutant-specific deminimus concentration. In addition, if current monitoring data already exist and these data are representative of the proposed source area, then at the discretion of the Department these data may be used.

Two particulate matter monitors are located within close proximity of the Crystal River plant. These monitors measure total suspended particulates (TSP) and are operated by Florida Power Corporation. Two years of recent data from each of these monitors are shown on Table 1a. The applicant has proposed that the data from station number 2 (the closest monitor to the plant) best represents the particulate levels in and around the plant. Since the applicable ambient air quality standard is based on particulate matter less than or equal to 10 micrometers in diameter (PM10), a conservative estimate of the background concentration levels of these particulates is made by assuming a PM10 background concentration equal to the TSP background

concentration. Based on these data an annual average background concentration of 26 ug/m^3 is estimated with a maximum 24-hour average background of 54 ug/m^3. No attempt was made to substract out the contribution of particulates from existing particulate sources at the Crystal River plant.

Modeling Methodology

The Industrial Source Complex Short-Term (ISCST) model (version 88348) was used to evaluate the particulate emissions from all sources at the Crystal River plant. All modeling completed by the applicant followed the EPA Guidelines on Air Quality Models (Revised), w/Supplement A (1987). The ISCST model is a general air quality dispersion model capable of evaluating a wide variety of source types and dispersion situations. The model will estimate ground-level concentrations of small particles emitted into the atmosphere by point, area, or volume-type sources. It incorporates elements for plume rise, transport by the mean wind, and Gaussian dispersion. In addition, the model allows for the separation of sources, particulate deposition, building wake downwash, adjustment for calm conditions, and various other input and output features.

Five years of sequential hourly meteorological data (1982-1986) from the National Weather Service Office in Tampa were used in the model. The data collected at this site is considered to be representative of conditions in the area of the Crystal River plant. Since five years of data were used, the highest, second-high short-term predicted concentrations are compared with the appropriate ambient standards.

The stack and emission characteristics used in the model are listed in Tables 2, 3, and 4. These sources include the proposed new helper cooling towers, the existing cooling towers for Units 4, and 5, the power generation units 1, 2, 4, and 5, and numerous fugitive emissions sources for coal and lime storage and handling. These sources represent all particulate sources in the area of the Crystal River plant. Other sources, at distances away, were not explicitly modeled but are accounted for in the estimated background concentration.

Maximum concentrations were predicted along the plant boundary surrounding the Crystal River site. The contributions due to the proposed helper cooling towers, the PSD increment consuming sources, and all sources together were each calculated. Additional receptors were placed along the northern border of the Chassahowitzka National Wildlife Refuge Class I area (approximately 21 kilometers to the south) to evaluate the PSD increment consumption. A summary of the modeling results are given in Tables 5, 6, 7, and 8.

A more detailed description of the modeling analysis, along with the model output, is contained in the FPC Crystal River application for the helper cooling towers. The Department has reviewed the applicant's analysis and has found that it conforms with the guidelines established by the EPA and followed by the Department.

PSD Increment Analysis

The PSD increments represents the maximum allowed ambient concentration increase due to new sources of air pollution constructed after a baseline date. The allowed increases are different for different areas of the State. Two classes of areas are defined in the State, Class I areas, of which there are four in the State, and Class II areas, everywhere else. The Class I area increments for total particulates are 5 ug/m^3, annual average, and 10 ug/m^3, 24-hour average. For Class II areas they are 19 ug/m^3, for an annual average and 37 ug/m^3, for a 24-hour average.

The proposed helper cooling towers, along with most other sources of particulate matter at the Crystal River plant, are increment consuming. Only the sources associated with the Units 1 and 2 power generators are not. No other sources in the area surrounding the Crystal River site have been identified as increment consuming. The increment consuming sources at the plant are identified on Tables 2 and 3.

The Crystal River plant is located in a Class II area. In the area immediately surrounding the plant the increased emissions from new sources were modeled and the increased concentrations compared with the allowed Class II increments. The results (Table 6) show that, off plant property, the maximum increase in particulate matter concentration is 5 ug/m^3, annual average and 28 ug/m^3, 24-hour average. Both of these estimates are less than the allowed Class II increment.

The Crystal River plant is located approximately 21 kilometers from the Chassahowitzka National Wildlife Refuge Class I area. As such, an analysis of the expected increased concentration level of particulates in this area is required. The maximum increases (Table 7) in particulate matter are predicted to be less than 1 ug/m^3, annual average and 2 ug/m^3, 24-hour average. Both of these estimates are less than the allowed Class I increments.

Ambient Air Quality Standards (AAQS)

An ambient air quality standard is defined for particulate matter less than or equal to 10 micrometers in diameter (PM10). The total concentration at a location should not exceed this standard. The estimation of the total impact in the area surrounding the Crystal River plant is determined by adding the maximum predicted modeled concentration to an estimated background concentration.

All sources of particulates in and around the Crystal River plant were included in the modeling. The PM10 emissions were estimated for each source. The estimated background concentration is based on total particulates and, thus, represents an over-estimate of the background sources.

The results of the AAQS analysis shows that the maximum predicted PM10 concentrations, off plant property, are 29 ug/m^3, annual average and 73 ug/m^3, 24-hour average, including a background concentration. These values are well below the AAQS for PM10 of 50 ug/m^3, annual average and 150 ug/m^3, 24-hour average. Table 8 summarizes these results.

Given existing air quality in the area of the Crystal River plant, the emissions from the proposed helper cooling towers are not expected to cause or contribute to an exceedance of the AAQS for PM10.

Additional Impacts Analysis

1. Impacts on Soils and Vegetation

The maximum ground-level concentration of PM10 is predicted to be less than the air quality standard. This standard is defined as both a primary and a secondary standard. The secondary standard is the level below which public welfare-related values, such as soils and vegetation, are protected.

The effects of salt particulate deposition on nearby vegetation and soils, as a result of the emissions from salt water cooling towers, is an issue of concern to local citizens. The applicant evaluated the estimated salt deposition due to the cooling towers in a separate document submitted to the Department. Maximum deposition rates, off plant property, were less than about 10 g/m^2-yr. This amount of deposition is not expected to cause any significant effects on soils or vegetation. The applicant is, however, continuing and expanding its salt deposition monitoring program and its periodic independent assessment of biology in the area surrounding the facility.

The potential impact of the increased emissions of the proposed helper cooling towers on the Class I area are expected to be minimal. Predicted concentration increases are less than the increment and this small amount of salt particulate added to a large natural background is not expected to affect the predominately salt water marsh-type area of the Refuge.

2. Impacts on Visibility

A Level-1 visibility screening analysis was performed by the applicant to evaluate the proposed helper cooling tower's impact on the Class I area. The results of this analysis show that the increased particulate loading by the helper cooling towers themselves will not significantly impair visibility in the Class I area.

3. Growth-Related Air Quality Impacts

The proposed construction and operation of the helper cooling towers is not expected to significantly change employment, population, housing, or commercial/industrial development in the surrounding area to the extent that a significant air quality impact will result.

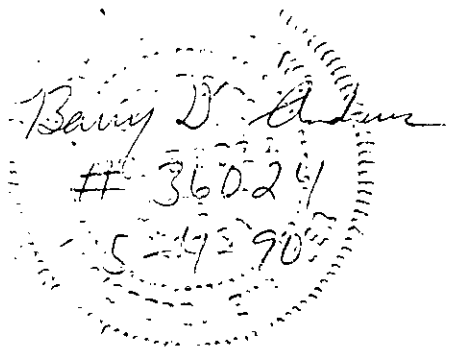
4. GEP Stack Height Determination

Good Engineering Practice (GEP) stack height is defined as the greater of: (1) 65 meters or (2) the maximum nearby building height plus 1.5 times the building height or projected width, whichever is less. Applicants cannot take credit for additional pollutant dispersion from stacks built higher than GEP stack height. The proposed helper cooling towers have a stack height of 16.2 meters.

The potential for building wake downwash effects were not considered by the applicant because the nearest off plant property receptors are 950 meters from the proposed helper cooling towers. This distance is far beyond the range for which building wake effects would impact the results.

V. Conclusion

Based on the information provided by FPC, the Department has reasonable assurance that the proposed construction of FPC's helper cooling towers for units 1, 2, and 3, as described in this evaluation, and subject to the conditions proposed herein, will not cause or contribute to a violation of any air quality standard, PSD increment, or any other technical provision of Chapter 17-2 of the Florida Administrative Code.



Specifications and Design Parameters for Helper Cooling Towers 1,2, and 3

Parameter	Value for: Case 1	Case 2
Number of towers	4	4
Number of fans/tower	9	10
Fan height (ft)	52.8	52.8
Fan diameter (ft) actual/fan	34.5	34.5
effective diameter using all fans for one tower	103.5	109.1
Fan flow rate (acfm)	1,139,500	1,139,500
Velocity (ft/s)	20.3	20.3
Exit temperature (°F)	102	102
Tower flow rate (gpm)	687,000	735,000
Drift rate (percent)	0.004	0.004
Total dissolved solids (ppm)	29,100	29,100
PM(TSP) emissions (lb/hr)	400	428
Building Dimensions, Tower Support Structure:		
Building Height (m)	12.8	12.8
Building Diagonal (m)	167.0	167.0

Table 12.

Florida Power Corporation Crystal River Power Plant
Summary of Particulate Matter Monitoring Data

Station Number	Time Period	Number of Samples	Percent Data Capture	Annual Geometric Mean (ug/m**3)	Observed 24-Hour Maximum (ug/m**3)	Observed 24-Hour 2nd Maximum (ug/m**3)
2	July 1985-June 1986	57	96.6	24	46	44
	July 1986-June 1987	58	98.7	26	57	54
4	July 1985-June 1986	54	91.5	33	76	61
	July 1986-June 1987	59	98.3	42	95	88

Note: Particulate matter measured as total suspended particulate

Source: Florida Power Corporation

Table 2

Summary of Point Sources Used in the ISCST Modeling Analysis

Source Number	Source Description	Location (m)[a] X	Location (m)[a] Y	Stack Height (m)	Diameter (m)	Velocity (m/s)	HI (TSP) Temperature (K)	Emissions (lb/hr)	Emissions (g/s)
HCT Case 1:									
101	Tower 1	240	0	16.1	31.60	6.19	312.0	100	12.60
102	Tower 2	52	0	16.1	31.60	6.19	312.0	100	12.60
103	Tower 3	-203	0	16.1	31.60	6.19	312.0	100	12.60
104	Tower 4	-390	0	16.1	31.60	6.19	312.0	100	12.60
HCT Case 2:									
101	Tower 1	240	0	16.1	33.30	6.19	312.0	107	13.48
102	Tower 2	52	0	16.1	33.30	6.19	312.0	107	13.48
103	Tower 3	-203	0	16.1	33.30	6.19	312.0	107	13.48
104	Tower 4	-390	0	16.1	33.30	6.19	312.0	107	13.48
Other Sources:									
110	Unit 4 Cooling Tower	700	911	135.0	65.20	3.32	311.0	175	22.10
120	Unit 5 Cooling Tower	700	665	135.0	65.20	3.32	311.0	175	22.10
130	Units 4 and 5 Power Generation	1,050	732	178.2	7.77	21.03	396	1251	156.6
135	Unit 4 and 5 Coal Baghouses	926	732	42.7	0.84	21.20	310.0	7	0.88
140[b]	Unit 2 Power Generation	639	-310	153.0	4.88	48.77	422.0	463	58.30
150[b]	Unit 1 Power Generation	700	-310	152.0	4.57	40.54	417.0	364	45.90
160	Progress Material Baghouses	517	21	18.3	0.61	11.40	325.0	2	0.21

[a]Origin of coordinate system is located on Tower 2, 52 meters west of center.
[b]Not a PSD increment consuming source.

Table 3

Summary of Area Source Parameters Used in the ISCST Modeling Analysis--PM(TSP) Emissions

Source Number	Source Description	Location (m)[a] X	Location (m)[a] Y	Height (m)	Area (m^2)	Actual Width (m)	Modeled Width (m)	Basis of Emission Rate Scalars	Particulate Emissions (lb/day)	Particulate Emissions (g/s)	Particulate Emissions ($g/s/m^2$)
10	Unit 4/5 Active Ash Pile (wind erosion)	1,948	460	12.0	10,118	100.6	100.0	Wind > 12 mph	53	0.28	0.0000277
11	Haul Road to Unit 4/5 Active Ash Pile	1,948	460	12.0	10,118	100.6	100.0	12 hr/day	30	0.32	0.0000315
12	Unit 4/5 Coal Transfer	460	-753	3.0	145,352	381.3	380.0	24 hr/day	11	0.06	0.0000004
20	Unit 4/5 Inactive Ash Pile (wind erosion)	1,876	393	24.4	15,177	123.2	125.0	Wind > 12 mph	40	0.21	0.0000133
21	Unit 4/5 Inactive Ash Pile (wind erosion)	2,000	393	24.4	15,177	123.2	125.0	Wind > 12 mph	40	0.21	0.0000133
30	Unit 4/5 Inactive Coal Pile (wind erosion)	1,380	563	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0.0000058
32	Unit 4/5 Inactive Coal Pile (wind erosion)	1,380	381	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0 0000058
34	Unit 4/5 Inactive Coal Pile (wind erosion)	1,561	563	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0.0000058
35	Unit 4/5 Inactive Coal Pile (wind erosion)	1,561	381	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0.0000058
31	Unit 4/5 Active Coal Pile (maintenance)	1,380	563	3.0	22,764	150.9	150.0	24 hr/day	38	0.20	0.0000089
33	Unit 4/5 Active Coal Pile (maintenance)	1,380	381	3.0	22,764	150.9	150.0	24 hr/day	38	0.20	0.0000089
40[b]	Unit 1/2 Bottom Ash (wind erosion)	145	12	5.0	125,457	354.2	350.0	Wind > 12 mph	360	1.89	0.0000154
41	Progress Materials (fugitive emissions)	480	-75	5.0	6,400	80.0	80.0	12 hr/day	78	0.82	0.0001280
50	Ideal Basic (wind erosion)	-97	-363	5.0	91,058	301.8	300.0	Wind > 12 mph	41	0.22	0.0000024
51	Ideal Basic (general operation)	-97	-363	5.0	91,058	301.8	300.0	24 hr/day	13	0.07	0.0000008
52	Ideal Basic Quarry (wind erosion)	600	3000	3.8	3,147	56.1	56.1	Wind > 12 mph	28	0.14	0.0000459
53	Ideal Basic Quarry (general operation)	600	3000	3.8	3,147	56.1	56.1	12 hr/day	117	1.23	0.000390
60[b]	Unit 1/2 Inactive Coal Pile (wind erosion)	460	-753	5.0	36,423	190.8	190.0	Wind > 12 mph	49	0.26	0.0000071
61[b]	Unit 1/2 Inactive Coal Pile (wind erosion)	650	-753	5.0	36,423	190.8	190.0	Wind > 12 mph	49	0.26	0.0000071
62[b]	Unit 1/2 Active Coal Pile (maintenance)	460	-753	5.0	36,423	190.8	190.0	24 hr/day	106	0.56	0.0000154

[a]Relative to helper cooling towers.
[b]Not a PSD increment-consuming source.

Table 4

Summary of Area Source Parameters Used in the ISCST Modeling Analysis--PM10 Emissions

Source Number	Source Description	Location (m)[a] X	Location (m)[a] Y	Height (m)	Area (m^2)	Actual Width (m)	Modeled Width (m)	Basis of Emission Rate Scalars	Particulate Emissions (lb/day)	Particulate Emissions (g/s)	Particulate Emissions ($g/s/m^2$)
10	Unit 4/5 Active Ash Pile (wind erosion)	1,948	460	12.0	10,118	100.6	100.0	Wind > 12 mph	53	0.28	0.0000277
11	Haul Road to Unit 4/5 Active Ash Pile	1,948	460	12.0	10,118	100.6	100.0	12 hr/day	13	0.32	0.000014
12	Unit 4/5 Coal Transfer	460	-753	3.0	145,352	381.3	380.0	24 hr/day	5	0.03	0.0000002
20	Unit 4/5 Inactive Ash Pile (wind erosion)	1,876	393	24.4	15,177	123.2	125.0	Wind > 12 mph	40	0.21	0.0000133
21	Unit 4/5 Inactive Ash Pile (wind erosion)	2,000	393	24.4	15,177	123.2	125.0	Wind > 12 mph	40	0.21	0.0000133
30	Unit 4/5 Inactive Coal Pile (wind erosion)	1,380	563	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0.0000058
32	Unit 4/5 Inactive Coal Pile (wind erosion)	1,380	381	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0.0000058
34	Unit 4/5 Inactive Coal Pile (wind erosion)	1,561	563	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0.0000058
35	Unit 4/5 Inactive Coal Pile (wind erosion)	1,561	381	3.0	22,764	150.9	150.0	Wind > 12 mph	25	0.13	0.0000058
31	Unit 4/5 Active Coal Pile (maintenance)	1,380	563	3.0	22,764	150.9	150.0	24 hr/day	18	0.09	0.0000041
33	Unit 4/5 Active Coal Pile (maintenance)	1,380	381	3.0	22,764	150.9	150.0	24 hr/day	18	0.09	0.0000041
40[b]	Unit 1/2 Bottom Ash (wind erosion)	145	12	5.0	125,457	354.2	350.0	Wind > 12 mph	360	1.89	0.0000154
41	Progress Materials (fugitive emissions)	480	-75	5.0	6,400	80.0	80.0	12 hr/day	78	0.82	0.0001280
50	Ideal Basic (wind erosion)	-97	-363	5.0	91,058	301.8	300.0	Wind > 12 mph	41	0.22	0.0000024
51	Ideal Basic (general operation)	-97	-363	5.0	91,058	301.8	300.0	24 hr/day	6	0.03	0.0000004
52	Ideal Basic Quarry (wind erosion)	600	3000	3.8	3,147	56.1	56.1	Wind > 12 mph	28	0.14	0.0000459
53	Ideal Basic Quarry (general operation)	600	3000	3.8	3,147	56.1	56.1	12 hr/day	117	1.23	0.000390
60[b]	Unit 1/2 Inactive Coal Pile (wind erosion)	460	-753	5.0	38,423	190.8	190.0	Wind > 12 mph	49	0.26	0.0000071
61[b]	Unit 1/2 Inactive Coal Pile (wind erosion)	650	-753	5.0	36,423	190.8	190.0	Wind > 12 mph	49	0.26	0.0000071
62[b]	Unit 1/2 Active Coal Pile (maintenance)	460	-753	5.0	36,423	190.8	190.0	24 hr/day	49	0.26	0.0000057

[a]Relative to helper cooling towers.
[b]Not a PSD increment-consuming source.

Table 5

PM(TSP) and PM10 Impacts Predicted for the Proposed Helper Cooling Towers 1, 2, and 3 in the Screening Modeling Analysis

Averaging Period	Year	Case 1			Case 2		
		Impact ($\mu g/m^3$)	Direction (deg)	Distance (m)	Impact ($\mu g/m^3$)	Direction (deg)	Distance (m)
PM(TSP)							
Annual	1982	0.46	230	950	0.47	230	950
	1983	0.42	230	950	0.43	230	950
	1984	0.50	230	950	0.51	230	950
	1985	0.42	230	950	0.44	230	950
	1986	0.43	230	950	0.44	230	950
24-Hour	1982	3.1	230	950	3.2	230	950
	1983	3.1	75	2,200	3.0	75	2,200
	1984	3.2	75	2,200	3.2	75	2,700
	1985	3.6	80	2,200	3.5	80	2,200
	1986	3.2	80	2,200	3.1	80	2,200
PM10							
Annual	1982	0.14	70	2,300	0.13	70	2,700
	1983	0.12	70	2,300	0.11	70	2,300
	1984	0.13	65	2,300	0.13	65	2,700
	1985	0.21	75	2,200	0.20	70	2,200
	1986	0.21	80	2,300	0.20	80	2,200
24-Hour	1982	1.6	100	3,750	1.6	100	2,200
	1983	1.9	75	2,300	1.8	75	2,200
	1984	1.8	75	2,300	1.8	75	2,700
	1985	2.1	80	2,200	2.1	80	2,200
	1986	1.9	80	2,200	1.9	80	2,200

Note: PSD significance levels for PM(TSP) are 1 $\mu g/m^3$ for annual average and 5 $\mu g/m^3$ for 24-hour averaging times, respectively. PSD significance levels currently do not exist for PM10.

Table 5

PM(TSP) and PM10 Class II PSD Increment Consumption for the Screening Modeling Analysis

Averaging Period	Year	Case 1			Case 2		
		Impact ($\mu g/m^3$)	Direction (deg)	Distance (m)	Impact ($\mu g/m^3$)	Direction (deg)	Distance (m)
PM(TSP)							
Annual	1982	4.0	75	2,200	4.0	75	2,200
	1983	4.3	75	2,200	4.2	75	2,200
	1984	4.5	75	2,200	4.5	75	2,200
	1985	5.3	75	2,200	5.3	75	2,200
	1986	5.3	75	2,200	5.3	75	2,200
24-Hour	1982	25.4	75	2,200	25.4	75	2,200
	1983	26.8	80	2,200	26.8	80	2,200
	1984	27.9	80	2,200	27.9	80	2,200
	1985	27.3	75	2,200	27.3	75	2,200
	1986	27.6	80	2,300	27.6	80	2,300
PM10							
Annual	1982	2.1	75	2,200	2.1	75	2,200
	1983	2.3	75	2,200	2.3	75	2,200
	1984	2.4	75	2,200	2.4	75	2,200
	1985	2.8	75	2,200	2.8	75	2,200
	1986	2.6	75	2,200	2.6	75	2,200
24-Hour	1982	13.9	80	2,200	14.0	80	2,200
	1983	17.4	80	2,200	17.4	80	2,200
	1984	17.8	80	2,300	17.8	80	2,300
	1985	16.6	80	2,200	16.6	80	2,200
	1986	13.6	75	2,200	13.5	75	2,200

Note: PSD Class II increments for PM(TSP) are 19 $\mu g/m^3$ for annual and 37 $\mu g/m^3$ for 24-hour averaging times, respectively. Proposed Class II increments for PM10 are 17 $\mu g/m^3$ for annual and 30 $\mu g/m^3$ for 24-hour averaging times, respectively.

Table 7

PM(TSP) and PM10 Class I PSD Increment Consumption for the Screening Modeling Analysis

Averaging Period	PM(TSP) Impact ($\mu g/m^3$)			PM10 Impact ($\mu g/m^3$)	
	Year	Case 1	Case 2	Case 1	Case 2
Annual	1982	0.11	0.11	0.08	0.07
	1983	0.14	0.14	0.09	0.09
	1984	0.17	0.17	0.11	0.11
	1985	0.14	0.14	0.09	0.09
	1986	0.11	0.11	0.07	0.07
24-Hour	1982	1.6	1.6	1.3	1.3
	1983	1.8	1.7	1.4	1.4
	1984	2.3	2.3	1.4	1.4
	1985	2.3	2.3	1.4	1.3
	1986	1.6	1.6	1.3	1.3

Note: PSD Class I increments for PM(TSP) are 5 $\mu g/m^3$ for annual and 10 $\mu g/m^3$ for 24-hour averaging times, respectively. Proposed Class I Increments for PM10 are 4 $\mu g/m^3$ for annual and 8 $\mu g/m^3$ for the 24-hour averaging times, respectively.

Table 9

PM10 Predicted AAQS Impacts for Screening Modeling Analysis

Averaging Period	Year	Case 1			Case 2		
		Impact ($\mu g/m^3$)	Direction (deg)	Distance (m)	Impact ($\mu g/m^3$)	Direction (deg)	Distance (m)
Annual	1982	2.5	230	950	2.5	230	950
	1983	2.5	75	2,200	2.5	75	2,200
	1984	2.5	230	950	2.6	75	2,200
	1985	3.1	75	2,200	3.1	75	2,200
	1986	2.9	75	2,200	2.9	75	2,200
24-Hour	1982	15.6	80	2,200	15.6	80	2,200
	1983	17.7	80	2,200	17.7	80	2,200
	1984	18.7	80	2,300	18.8	80	2,300
	1985	18.1	30	1,250	18.1	30	1,250
	1986	15.7	75	2,200	15.7	75	2,200

Note: PM10 AAQS are 50 $\mu g/m^3$ for annual and 150 $\mu g/m^3$ for 24-hour averaging times, respectively.

The 24-hour and annual background concentration due to sources not modeled are assumed to be 54 and 26 $\mu g/m^3$.

Florida Department of Environmental Regulation

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

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

PERMITTEE:

Florida Power Corporation
P. O. Box 14042
St. Petersburg, Fl 33233

Permit Number: AC 09-162037
PSD-FL-139
Expiration Date: June 30, 1993
County: Citrus
Latitude/Longitude: 28°57'35"
82°42'30"
Project: Helper Cooling Towers
For Units 1, 2, and 3

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-2 and 17-4. 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 made a part hereof and specifically described as follows:

For the construction of helper cooling towers for Units 1, 2, and 3. Two design options include four towers with 9 (or 10) cells each and a total of 36 (or 40) fans to cool approximately 687,000 (or 735,000) gpm of saltwater at about 102.4°F to 91°F. High efficiency (99.8%) drift eliminators will control the salt water drift. The project will be located at the existing Crystal River Plant in Citrus County, Florida. The UTM coordinates of this facility are Zone 17, 333.8 km East and 3204.5 km North.

The source shall be in accordance with the permit application, plans, documents, amendments and drawings, except as otherwise noted in the General and Specific Conditions.

Attachments are listed below:

1. FPC's application package received March 9, 1989.
2. DER's letter dated April 7, 1989.
3. FPC's response received May 30, 1989.
4. FPC's letter received July 10, 1989.
5. EPA's letter to FPC received August 2, 1989.
6. Preliminary Determination dated August 2, 1989.
7. FPC's comments received August 28, 1989.
8. EPA's comments received September 8, 1989.
9. FPC's test proposal received September 15, 1989.
10. FPC's comments received October 23, 1989.
11. FPC's Phase II test report received February 6, 1990.
12. FPC's Phase III test report received March 9, 1990.
13. FPC's letter received March 19, 1990.
14. DER's revised Preliminary Determination dated March 28, 1990.

PERMITTEE:

Florida Power Corp.

Permit Number: AC 09-162037
PSD-FL-139

Expiration Date: June 30, 1993

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, Florida Statutes. 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), Florida Statutes, 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 Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

GENERAL CONDITIONS:

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.

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.

GENERAL CONDITIONS:

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 Florida Statutes or Department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes. 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 Florida Statutes after a reasonable time for compliance, provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.120 and 17-30.300, 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)

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.

GENERAL CONDITIONS:

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.

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:

1. Each mechanical draft helper cooling tower's operating hours shall not exceed 4,320 annually (about 6 months per year).

2. The maximum allowable emissions of particulate matter from each of the four cooling towers based on a 0.004% drift rate (ratio of drift to the circulation rate) shall not exceed the following:

Design	TSP		PM10		Total 4 Towers	
Option	lbs/hr	TPY	lbs/hr	TPY	lbs/hr	TPY
9 cell	100	216	50	108	400	864
10 cell	107	231	54	116	428	925

Note: Emissions are based on a drift emission rate of 0.004% of the circulating water rate of 172,000 gpm for 9 cell design (total for 4 towers of 687,000 gpm - 36 cells) and 184,000 gpm for 10 cell design (total for 4 towers of 735,000 gpm - 40 cells).

SPECIFIC CONDITIONS:

3. The total TSP and PM10 fugitive dust emissions from the sources addressed in the revised technical evaluation are estimated to be 54 TPY and 34 TPY respectively, for inventory purposes. These emissions shall be controlled as detailed in the revised application.

4. Compliance tests, on a randomly selected cell, shall be conducted for each cooling tower while it is operated at 90-100% capacity. Initial compliance tests for determining particulate matter emissions shall be conducted in accordance with the July 1, 1988 version 40 CFR 60 Appendix A, using EPA Method 5, or any other equivalent method approved by the Department pursuant to F.A.C. Rule 17-2.700(3)-Exceptions and Approval of Alternate Procedures and Requirements. Specifically when using EPA Method 5, a distilled water rinse shall be used in place of acetone, and the impinger catch shall be excluded from emission calculations. Tests shall be repeated at the time of operation permit renewal.

5. A log shall be maintained of the hours of operation and flow rate of the pumps supplying salt water to each helper cooling tower.

6. The drift eliminators shall be installed such that minimum bypass occurs. Regular maintanence shall be carried out to keep the drift eliminators functioning properly.

7. The permittee shall comply with all the applicable provisions of Chapters 17-2 and 17-4 of the Florida Administrative Code.

8. Any changes in the method of operation, equipment, or operating hours shall be submitted to DER's Southwest district office for approval.

9. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to DER's Bureau of Air Regulation prior to 60 days before the expiration of the permit (F.A.C. 17-4.090).

10. An application for an operation permit must be submitted to the Southwest district office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. To properly apply for an operation permit, the applicant shall submit the appropriate 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 (F.A.C. 17-4.220).

PERMITTEE:

Florida Power Corp.

Permit Number: AC 09-162037
PSD-FL-139
Expiration Date: June 30, 1993

Issued this _____ day
of _____, 1990

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

Best Available Control Technology (BACT) Determination
Helper Cooling Towers
Florida Power Corporation
Citrus County

The applicant proposes to install four helper cooling towers at the Crystal River power plant located eight miles northwest of Crystal River, Florida. The cooling towers will be constructed to maintain the discharge water temperature at the plant site to a level which complies with the facility's National Pollutant Discharge Elimination System (NPDES) permit limitations. Prior difficulties with complying with the NPDES outflow temperature limitation have initiated this requirement by the Environmental Protection Agency (EPA) that the cooling towers be constructed to maintain the proper temperature.

The applicant has indicated the maximum total annual tonnage of regulated air pollutants emitted from the four cooling towers based on 4,320 hours per year operation to be as follows:

Pollutant	Maximum Emissions (tons/yr)	PSD Significant Emission Rate tons/yr
Particulate Matter	432.5	25
PM_{10}	21.0 (estimate)	15

Rule 17-2.500(2)(f)2. of the Florida Administrative Code requires a BACT review for all regulated pollutants emitted from major facilities in an amount equal to or greater than the significant emission rates listed in the previous table.

BACT Determination Requested by the Applicant

The BACT Determination requested by the applicant is given below:

Pollutant	Determination
Particulate Matter (includes PM_{10})	Drift Eliminators (99.6% efficient)

Date of Receipt of a BACT Application

March 9, 1989

Review Group Members

This determination was based upon comments received from the applicant and the Permitting and Standards Section.

BACT Determination Procedure:

In accordance with Florida Administrative Code Chapter 17-2, Air Pollution, this BACT determination will be 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 objections.

BACT Analysis

A review of the BACT/LAER Clearinghouse does not indicate that BACT determinations have previously been completed for cooling towers.

Evaporative cooling towers are used to provide waste heat rejection at electric power stations in order to improve efficiency and to lower cooling water discharge temperatures to environmentally safe levels. When brackish or saline water is used for cooling purposes there is typically drift emitted from the cooling tower. Drift is defined as the current of water droplets which are mechanically entrained in the cooling tower exhaust flow. Thus, it has a chemical composition similar to the circulating water in the cooling tower.

The Crystal River power untis (1-3) use water obtained from the Gulf of Mexico for cooling purposes. In order to minimize the drift emitted from the towers, drift eliminators capable of controlling drift to 0.004 percent of the circulating water have been proposed.

Drift eliminators operate on the principle of centrifugal separation by causing the cooling tower exhaust stream to pass through curved ducts, with the heavy water droplets becoming trapped on the duct walls. Although vendors have guaranteed tower drift rates as low as 0.001 percent, consideration must be given to the test methods that support these guarantees.

There are several test methods that have been used or have been proposed for use to quantify drift rates. These methods are listed as follows:

1) Sensitized Paper
2) EPA Method 13A
3) EPA Method 5
4) Heated Glass Beads Isokinetic Method

The applicant has indicated that each of the mist eliminator vendors who submitted proposals guaranteed a drift rate of 0.001 percent based on the sensitive paper testing method. The sensitized paper method essentially uses the same principal to capture particulates as the mist eliminators themselves. In this method droplet collection is achieved by inertial impaction on water sensitive paper. The paper, which is chemically treated, is suspended above the mist eliminators such that droplets from the cooling tower will impinge upon the paper and generate a well-defined stain. The size and shape of the stain are functions of the impingement dynamics, i.e., speed and angle, and of the original droplet diameter. Based on simulation, a relationship between the stain and the droplet size has been developed.

Although the sensitized paper method has been widely used for drift measurements, it does have a major drawback. Testing has indicated that the sensitized paper method cannot provide data on droplet sizes below about 20-30 microns. Droplets with sizes below this range do not have the mass necessary to be captured by inertial impaction. These droplets tend to exhibit the same characteristic as the gaseous portion of the cooling tower exhaust and pass around the sensitive paper without being captured. This situation can be avoided to some degree by using methods which utilize isokinetic sampling.

Isokinetic sampling methods utilize equipment which allow samples to be drawn from a gas stream with a sampling velocity which is essentially equivalent to the velocity of the gas steam itself. By this means the tendency for small particles to pass around the sampling device is minimized, thereby allowing the smallest particles to be captured. EPA Methods 13A and 5 and the heated glass beads method utilize the equipment necessary to perform sampling isokinetically.

A review of the isokinetic sampling methods used for sampling cooling towers indicates much variability. Testing results from one cooling tower indicates drift rates ranging from 0.0039 to 0.344 percent using repeated EPA Method 13A testing. This variability suggests that a drift limitation backed by EPA Method 13A testing may result in compliance problems which originate from faults with the test method itself.

Previous testing with the heated glass bead method indicates a testing variability which is much less than that which has been demonstrated by EPA Method 13A. The majority of the testing that has been conducted on cooling tower drift has been completed with either the heated glass bead or sensitized paper method. Based on the amount of data and the level of variability experienced, the heated glass bead method may have a stronger basis for backing a given drift limitation.

EPA Method 5 is another testing method that should be considered. Although EPA Method 5 has not been used previously for cooling tower drift measurement, the EPA believes that this method would yield results which are less variable than EPA Method 13A and would be more in line with the heated glass bead method.

Based on EPA's recommendation, the applicant has conducted recent testing using EPA Methods 5, 13a, and the Hot Bead Isokinetic Test Procedure. The study confirmed EPA's notion and established Method 5 as the preferred test method.

The Method 5 testing indicated that a test cell drift rate of 0.0004% can be achieved under the optimum configuration. This drift rate is based on a limited number of tests. Factors affecting drift rate when scaling up from a test cell to full scale application, indicate that the drift rate will increase 5 fold. In addition, when comparing any two test results achieved with a specific design configuration, the results between tests varied by a factor of 2. To allow an adequate margin for the test uncertainty, scale-up factors, and operation/maintenance margin, FPC proposes that the permitted drift limit be 0.004%.

Environmental Impact Analysis

A review of the proposed cooling tower installations should account for the uniqueness of this particular project from an environmental standpoint. There are two factors that need to be considered:

1) The overall benefit of constructing the cooling towers

2) The existing background concentrations

As noted in the introduction of this determination, the proposal to construct the helper cooling towers is directed at complying with the EPA's request to reduce the outlet temperature of the cooling water used for units 1, 2, and 3. As this is the case, the proposal should be evaluated from the standpoint of providing an overall benefit to the environment and not the potential air impacts only.

It should be noted that although the cooling towers will emit particulates in the form of salt, the overall contribution to the area from the towers will be minimal. The Crystal River Power Facility is located approximately one mile from the Gulf of Mexico. It is expected that the natural contributions of salt deposition from wave action to this area will be substantially greater than that which would be emitted from the cooling towers.

BACT Determination by DER

Based on the information presented by the applicant and the Department's subsequent review, the Department believes that BACT is represented by using state-of-the-art drift eliminators and by limiting the drift rate to 0.004 percent, with EPA Method 5 or a departmental approved equivalent using the Alternate Sampling Procedure to be used as the basis for compliance.

Details of the Analysis May be Obtained by Contacting:

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Recommended by:

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

_____ 1990
Date

Approved by:

Dale Twachtmann, Secretary
Dept. of Environmental Regulation

_____ 1990
Date