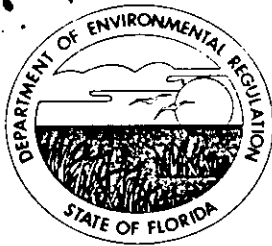


File Copy



# 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

August 4, 1989

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

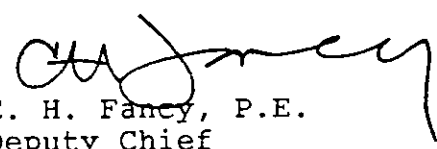
Ms. Patsy Y. Baynard  
Florida Power Corporation  
Post Office Box 14042  
St. Petersburg, Florida 33233

Dear Ms. Baynard:

Attached is one copy of the 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. Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

  
C. H. Fancy, P.E.  
Deputy Chief  
Bureau of Air Quality  
Management

CHF/pr

Attachments

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

Reading File  
Pradeep Raval  
Tom Rogers  
Barry Andrews } 8-4-89 RAN

P 538 762 642

**RECEIPT FOR CERTIFIED MAIL**

NO INSURANCE COVERAGE PROVIDED  
NOT FOR INTERNATIONAL MAIL

(See Reverse)

PS Form 3800, June 1985

Sent to Ms. Patsy Y. Baynard	
Florida Power Corp.	
P.O. Box 14042	
St. Petersburg, FL 33233	
Postage	\$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	\$
Postmark or Date mailed: 8/4/89 AC 09-162037 PSD-FL-139	

<p><b>SENDER:</b> Complete items 1 and 2 when additional services are desired, and complete items 3 and 4. Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional services requested.</p> <p>1. <input checked="" type="checkbox"/> <b>SERVICE NOT PREPAID</b> (Extra charge) 2. <input type="checkbox"/> Restricted Delivery (Extra charge)</p>	
<p>3. Article Addressed to: Ms. Patsy Y. Baynard Florida Power Corp. P.O. Box 14042 St. Petersburg, FL 33233</p>	<p>4. Article Number P 538 762 642</p> <p>Type of Service:  <input type="checkbox"/> Registered <input type="checkbox"/> Insured  <input checked="" type="checkbox"/> Certified <input type="checkbox"/> COD  <input type="checkbox"/> Express Mail <input type="checkbox"/> Return Receipt for Merchandise         </p> <p>Always obtain signature of addressee or agent and DATE DELIVERED.</p>
<p>5. Signature — Address X</p>	<p>8. Addressee's Address (ONLY if requested and fee paid)</p>
<p>6. Signature — Agent X <i>Alan M. Rugg</i></p>	
<p>7. Date of Delivery AUG 07 1989</p>	<p><b>SERVICE NOT PREPAID</b></p>

PS Form 3811, Mar. 1988

★ U.S.G.P.O. 1988-212-865

DOMESTIC RETURN 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

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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 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

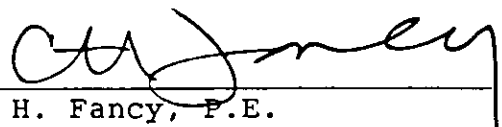
(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

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.  
Deputy Chief  
Bureau of Air Quality  
Management

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 8-4-89.

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.

Martha Wise 8-4-89  
Clerk 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 TSP emissions from the saltwater helper cooling towers are expected to be 200.2 lbs/hr and 432.5 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 <sup>3</sup>	% consumed	Annual ug/m <sup>3</sup>	% consumed
Class I	2	20	1	20
Class II	36	97	6	32

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 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 Quality Management  
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. Bill Thomas 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.

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 Quality Management  
Central Air Permitting

August 2, 1989

## 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 May 30, 1989.

## 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. Four towers with nine cells each and a total of 36 fans will cool about 687,000 gpm 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 will 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.

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. At a later date, should data be available to justify the use of some other test method, the Department will re-evaluate the testing requirements, upon request. The total suspended (TSP) particulate matter emissions from the cooling towers are estimated to be 200.2 lbs/hr and 432.5 tons per year (TPY). No accurate data is available on the quantity of particulates less than 10 micrometers in diameter (PM10).

The applicant has also provided a list of fugitive dust emission sources at the facility. Emissions estimates shown on Table 2 have been calculated 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 64.6 and 39.5 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 0.002% of the water circulation rate. At a rate of 687,000 gpm, the allowable particulate emission rate will be 200.2 lbs/hr and 432.5 TPY, while operating for 4,320 hrs/year (180 days 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. The four towers proposed will process 687,000 gallons per minute of heated cooling water taken from the Gulf of Mexico. The salt contained in this 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.

Particulate matter emissions from these helper cooling towers are estimated to be 432 tons per year. It is further estimated that less than 5 percent of these emissions (21 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:

- o An analysis of existing air quality;
- o A PSD increment analysis;
- o An Ambient Air Quality Standards (AAQS) analysis;

- o An analysis of impacts on soils, vegetation, visibility, and growth-related air quality impacts; and,
- o 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 de minimus 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 1. 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 (PM<sub>10</sub>), a conservative estimate of the background concentration levels of these particulates is made by assuming a PM<sub>10</sub> background concentration equal to the TSP background concentration. Based on these data an annual average background concentration of 26 ug/m<sup>3</sup> is estimated with a maximum 24-hour average background of 54 ug/m<sup>3</sup>. No attempt was made to subtract 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 6-88167) 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 Table 2. 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 is given in Table 3.

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<sup>3</sup>, annual average, and 10 ug/m<sup>3</sup>, 24-hour average. For Class II areas they are 19 ug/m<sup>3</sup>, for an annual average and 37 ug/m<sup>3</sup>, 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 Table 2.

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 show that, off plant property, the maximum increase in particulate matter concentration is 6 ug/m<sup>3</sup>, annual average and 36 ug/m<sup>3</sup>, 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 in particulate matter are predicted to be less than 1 ug/m<sup>3</sup>, annual average and 2 ug/m<sup>3</sup>, 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 emissions of particulates calculated for each source were of total



particulates, of which PM10 is a subset. As such, the predicted maximum concentrations represent an over-estimate of the actual PM10 concentrations. Likewise, 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 33 ug/m<sup>3</sup>, annual average and 91 ug/m<sup>3</sup>, 24-hour average, including a background concentration. These values are well below the AAQS for PM10 of 50 ug/m<sup>3</sup>, annual average and 150 ug/m<sup>3</sup>, 24-hour average. Table 4 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<sup>2</sup>-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.

*John Thomas*  
8/4/89

Table 1

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	96.7	26	57	54
4	July 1985-June 1986	54	91.5	32	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

Florida Power Corporation Crystal River Power Plant  
Source and Emission Characteristics

Source Number	Source Description	Location (m) *		Height (m)	Area (m <sup>2</sup> )	Actual Width (m)	Modeled Width (m)	Basis of Emission Rate Scalars	Particulate Emissions		
		X	Y						(lb/day)	(g/s)	(g/s/m <sup>2</sup> )
10	Unit 4/5 Active Ash Pile (wind erosion)	1948	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	1948	460	12.0	10,118	100.6	100.0	12 hr/day	30	0.32	0.0000315
12	Unit 4/5 Coal Transfer	690	-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)	1876	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)	2000	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)	1380	563	3.0	22,764	150.9	150.0	Wind > 12 mph	41	0.22	0.0000096
32	Unit 4/5 Inactive Coal Pile (wind erosion)	1380	381	3.0	22,764	150.9	150.0	Wind > 12 mph	41	0.22	0.0000096
34	Unit 4/5 Inactive Coal Pile (wind erosion)	1561	563	3.0	22,764	150.9	150.0	Wind > 12 mph	41	0.22	0.0000096
35	Unit 4/5 Inactive Coal Pile (wind erosion)	1561	381	3.0	22,764	150.9	150.0	Wind > 12 mph	41	0.22	0.0000096
31	Unit 4/5 Active Coal Pile (maintenance)	1380	563	3.0	22,764	150.9	150.0	24 hr/day	64	0.33	0.0000148
33	Unit 4/5 Active Coal Pile (maintenance)	1380	381	3.0	22,764	150.9	150.0	24 hr/day	64	0.33	0.0000148
40 +	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 +	Unit 1/2 Bottom Ash Pile (Progress Materials)	145	12	5.0	125,457	354.2	350.0	12 hr/day	78	0.82	0.0000067
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	1.84	0.0005858
60 +	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 +	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
62 +	Unit 1/2 Active Coal Pile (maintenance)	460	-753	5.0	36,423	190.8	190.0	24 hr/day	106	0.56	0.0000104

\* Relative to helper cooling towers

+ Not a PSD increment consuming source

Table 1 (continued)

Florida Power Corporation Crystal River Power Plant  
Source and Emission Characteristics

Source Number	Source Description	Location (m) *		Stack Height (m)	Diameter (m)	Velocity (m/s)	Temper- ature (K)	Particulate Emissions	
		X	Y					(lb/hr)	(g/s)
100	Units 1-3 Helper Cooling Towers	0	0	15.2	10.52	6.20	306.0	198	25.00
110	Unit 4 Cooling Tower	714	508	135.0	65.20	3.32	311.0	175	22.10
120	Unit 5 Cooling Tower	714	650	135.0	65.20	3.32	311.0	175	22.10
130	Units 4 and 5 Power Generation	1077	786	170.2	7.77	21.03	396.0	1251	157.60
135	Unit 4 and 5 Coal Baghouses	932	786	42.7	0.84	21.20	310.0	7	0.88
140 +	Unit 2 Power Generation	677	-750	153.0	4.83	48.77	422.0	463	58.30
150 +	Unit 1 Power Generation	750	-750	152.0	4.57	40.54	417.0	364	45.90
160	Progress Material Baghouses	517	-113	18.3	0.61	11.40	325.0	2	0.21

\* Relative to Units 1-3 Helper Cooling towers

+ Not a PSD increment consuming source

Table 2 continued

## Summary of Fugitive Dust Emissions, Crystal River Power Plant

Source	Max. 24-Hr Emissions (lb/day)		Annual Avg. Emissions (TPY)	
	TSP	PM10	TSP	PM10
CR 4/5 Active Ash Storage:				
Transfer operations	0	0	0.023	0.011
Wind erosion	53	53	1.226	1.226
Vehicular traffic	30	13	3.034	1.365
CR 4/5 Inactive Ash Storage				
Wind erosion	79	79	1.839	1.839
CR 4/5 Coal Pile:				
CR 4/5 Transfer operations	36	18	3.440	1.689
Wind erosion	163	163	3.780	3.780
Pile maintenance/traffic	102	46	17.304	7.787
Ash transfer	0	0	0	0
CR 1/2 Bottom Ash Storage:				
• Transfer	0	0	0.006	0.003
• Wind erosion	357	359	8.338	8.338
Progress Materials:				
Transfer	1	0	0.064	0.031
Vehicular traffic	77	35	6.256	2.815
Wind erosion	1	1	0.200	0.200
Ideal Basic:				
Transfer	4	2	0.064	0.031
Vehicular traffic	9	4	0.002	0.001
Wind Erosion	41	41	0.940	0.940
CR 1/2 Coal Pile:				
• CR 1/2 Transfer operations	24	12	1.870	0.924
• Wind erosion	98	98	2.269	2.269
• Pile maintenance/traffic	82	37	13.942	6.274

\* Not a PSD increment consuming source

Table 3

Florida Power Corporation Crystal River Power Plant  
Screening Model Runs -- Receptors Along Plant Boundary

Proposed Helper Cooling Towers

Year	Max. Annual (ug/m**3)	Distance (m)	Direction (deg)	Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)	2nd Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)
1982	1.4	950	230	15.1	950	230	312	10.8	950	230	272
1983	1.3	950	230	13.2	950	230	354	9.5	950	230	294
1984	1.3	950	230	12.1	1600	250	351	8.8	1500	240	165
1985	1.2	1500	240	11.8	950	230	259	11.1	950	230	260
1986	1.2	950	230	15.3	1600	250	263	11.0	950	230	8

All Modeled Sources

Year	Max. Annual (ug/m**3)	Distance (m)	Direction (deg)	Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)	2nd Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)
1982	6.4	950	230	42.1	2250	70	235	35.6	2200	75	185
1983	5.8	950	230	54.3	2150	60	314	33.9	2150	60	257
1984	6.4	950	230	40.9	2200	75	231	36.7	2200	80	224
1985	6.3	2200	75	39.1	2200	75	179	37.0	2200	75	152
1986	6.5	2200	75	41.9	2200	80	228	35.7	2200	75	213

PSD Class I Increment Analysis

Year	Max. Annual (ug/m**3)	Distance (m)	Direction (deg)	Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)	2nd Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)
1982	0.1	21200	175	1.6	21100	180	67	1.4	21100	177	67
1983	0.1	21100	180	1.7	21100	180	84	1.3	21300	172	167
1984	0.1	21100	180	2.1	21100	180	328	1.5	21100	180	342
1985	0.1	21100	177	1.9	21100	180	354	1.2	21100	180	279
1986	0.1	21100	177	2.4	23800	155	56	2.1	23300	155	56

Table 3 (Continued)

## Florida Power Corporation Crystal River Power Plant

## Screening Modeling-- Receptors along plant boundary

## PSD Class II Increment Analysis

Year	Max. Annual (ug/m**3)	Distance (m)	Direction (deg)	Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)	2nd Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day (Julian)
1982	4.6	950	250	40.2	2250	70	235	32.6	2200	75	185
1983	5.0	2200	75	45.1	2150	60	314	32.5	2200	80	45
1984	5.3	2200	75	38.1	2200	75	231	35.8	2200	80	224
1985	6.0	2200	75	37.4	2200	80	136	34.5	2200	75	152
1986	6.1	2200	75	41.8	2200	80	228	32.6	1550	45	205

## Refined Model Results--Receptor Resolution 100 m range by 2 deg. azimuth

## PSD Class II Increment Analysis

Year	Days	Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day	2nd Max. 24-Hour (ug/m**3)	Distance (m)	Direction (deg)	Day
1982	185, 235	42.9	2200	77	185	32.6	2200	75	185
1983	30, 220	32.7	1700	50	30	32.6	1700	50	220
1984	174, 224	40.5	2200	78	224	35.8	2200	80	224
1985	152, 179	40.7	2200	77	152	34.5	2200	75	152
1986	205, 344	38.0	1550	45	344	32.6	1550	45	205

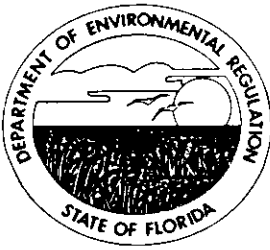


Table 4

Florida Power Corporation Crystal River Power Plant  
Comparison With Ambient Air Quality Standards

Year/ Averaging Period	Proposed Helper Cooling Towers (ug/m**3)	All Modeled Sources (ug/m**3)	Estimated Background (ug/m**3)	Max. Predicted PM10 Conc. (ug/m**3)	PM10 AAQS (ug/m**3)
<hr/>					
Annual					
1982	1.4	6.4	26	32	50
1983	1.3	5.8	26	32	
1984	1.3	6.4	26	32	
1985	0.3	6.3	26	32	
1986	0.3	6.5	26	33	
24-Hour					
1982	<4.4	35.6	54	90	150
1983	<3.7	33.9	54	88	
1984	<3.4	36.7	54	91	
1985	<4.5	37.0	54	91	
1986	<4.2	35.7	54	90	

Note: For the 24-hour values listed under the proposed cooling towers, the concentration listed is the maximum contribution at the location of the maximum for all modeled sources. The actual contribution, at the same location and time, would be less.



## Florida Department of Environmental Regulation

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

Bob Martinez, Governor

Dale Twachtman, 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: Dec. 30, 1991

County: Citrus

Latitude/Longitude: 28°57'35"  
82°42'30"

Project: Helper Cooling Towers

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. Four towers with nine cells each and a total of 36 fans will cool approximately 687,000 gpm at about 102.4°F to 91°F. Munter's 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.

**PERMITTEE:**

Florida Power Corp.

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

Expiration Date: Dec. 30, 1991

**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.

**PERMITTEE:**

Florida Power Corp.

Permit Number: AC 09-162037

PSD-FL-139

Expiration Date: Dec. 30, 1991

**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.

**PERMITTEE:**

Florida Power Corp.

Permit Number: AC 09-162037

PSD-FL-139

Expiration Date: Dec. 30, 1991

**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)
- ( ) Compliance with New Source Performance Standards

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.

**PERMITTEE:**

Florida Power Corp.

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

Expiration Date: Dec. 30, 1991

**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. The mechanical draft helper cooling tower operating hours shall not exceed 4,320 annually.

2. The maximum allowable emissions of particulate matter shall not exceed 200.2 lbs/hr and 432.5 TPY, based on a drift emission rate of 0.002% of the circulating water rate (687,000 gpm).

3. The total fugitive dust emissions from the sources addressed in the technical evaluation are estimated to be 64.6 TPY, for inventory purposes. These emissions shall be controlled as detailed in the application.

4. Initial compliance tests for determining particulate matter emissions shall be conducted using EPA Method 5 or 13A, or any other equivalent method approved by the Department pursuant to

PERMITTEE:

Florida Power Corp.

Permit Number: AC 09-162037

PSD-FL-139

Expiration Date: Dec. 30, 1991

SPECIFIC CONDITIONS:

F.A.C. Rule 17-2.700(3)-Exceptions and Approval of Alternate Procedures and Requirements. Tests shall be repeated once every five years upon renewal of the operation permit.

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

6. The drift eliminators shall be installed such that no bypass occurs. Regular maintenance shall be carried out to keep the drift eliminators functioning properly.

7. The permittee shall continue the salt drift monitoring program previously approved by EPA and DER.

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

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

10. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. 17-4.090).

11. 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).

Issued this \_\_\_\_\_ day  
of \_\_\_\_\_, 1989

STATE OF FLORIDA DEPARTMENT  
OF ENVIRONMENTAL REGULATION

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Dale Twachtman, 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 <sub>10</sub>	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 a 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 <sub>10</sub> )	Drift Eliminators (99.8 % 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 Stationary Source Control 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 units (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 0.002 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 contracted guaranteed a drift rate of 0.001 percent based on the sensitive paper testing method. In order to ensure that the level is not exceeded, the applicant has proposed a drift rate of 0.002 percent based on the sensitized paper 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 stream 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 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.

#### 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 Departments' subsequent review, the Department believes that BACT is represented by using state-of-the-art drift eliminators and by

limiting the drift rate to 0.002 percent, with EPA Method 5 or a departmental approved equivalent using the Alternate Sampling Procedure to be used as the basis for compliance.

Although the applicant requested using the sensitized paper method, the Department believes that the test method should be capable of demonstrating control for PM<sub>10</sub> (particulates with an aerodynamic diameter less than or equal to 10 microns). PM<sub>10</sub> is a regulated pollutant and is also subject to BACT in this case. . . . Since it has been established that EPA Method 5 or its equivalent is to be used as the basis for compliance, the Department believes that a drift rate of 0.002 percent is reasonable based on the variability experienced in general with the testing methods utilizing isokinetic sampling.

Details of the Analysis May be Obtained by Contacting:

Barry Andrews, P.E., BACT Coordinator  
Department of Environmental Regulation  
Bureau of Air Quality Management  
2600 Blair Stone Road  
Tallahassee, Florida 32399-2400

Recommended by:

\_\_\_\_\_  
C.H. Fancy, P.E.  
Deputy Bureau Chief, BAQM

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Date

1989

Approved by:

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Dale Twachtman, Secretary

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Date

1989

Attachments 1 - 4  
Available Upon Request

Attachment 5