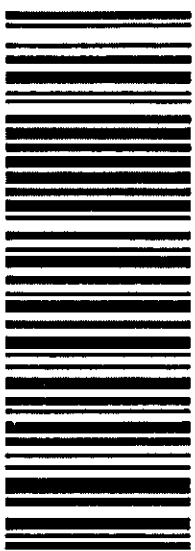
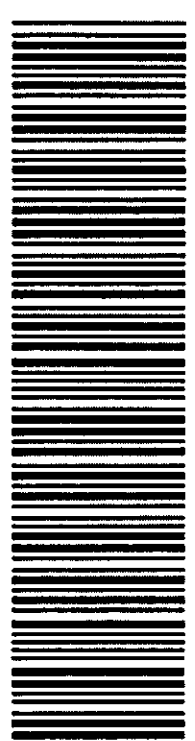


		<b>GND</b>		Pieces: <b>1/1</b>
<b>FM: DEP AIR RESOURCE MGMT</b> P. Adams DIRECTOR OFFICE STE 23 111 S MAGNOLIA DR TALLAHASSEE, FL 32301 UNITED STATES Phone: 850-921-9505 <b>To: DEP SOUTHWEST DISTRICT OFFICE</b> MS. MARA NASCA 8407 LAUREL FAIR CIRCLE AIR RESOURCES TAMPA, FL 33610 UNITED STATES		37550201000 A7 AP255 Sender's ref <b>TLH</b> ORIGIN:		<b>33610</b> POSTCODE:
Description: PSD-FL-379 and 0170004-0148015		Weight: 1 lbs for 1 pcs Date: 2006-07-25		TEL: 813-744-6100
DHL standard terms and conditions apply.		<b>26WE</b> Day		<b>ALEX OD</b> <b>FSC</b>
 (ZLJUS33610)				WAYBILL: 17126791850 (Non-Negotiable)

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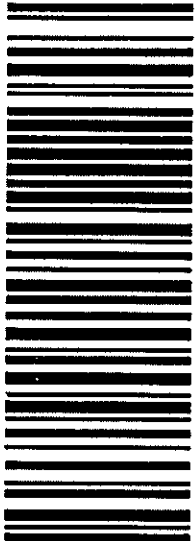
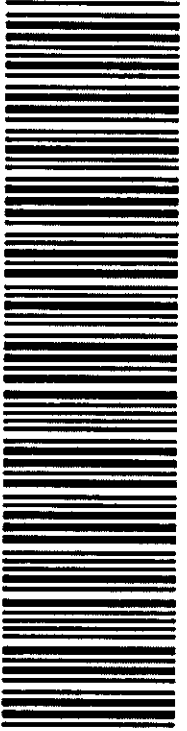
<b>SENDER'S RECEIPT</b> Waybill #: 17126791850  To(Company): DEP Southwest District Office Air Resources 8407 Laurel Fair Circle  Tampa, FL 33610 UNITED STATES  Attention To: Ms. Mara Nasca Phone#: 813-744-6100  Sent By: P. Adams Phone#: 850-921-9505	Rate Estimate: 3.1 Protection: Not Required Description: PSD-FL-379 and 0170004-0148015  Weight (lbs.): 1 Dimensions: 0 x 0 x 0  Ship Ref: 37550201000 A7 AP255 Service Level: Ground (Est. delivery in 1 business day(s))  Special Svc:  Date Printed: 7/25/2006 Bill Shipment To: Sender Bill To Acct: 778941286
---	--

DHL Signature (optional) \_\_\_\_\_ Route \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

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 [View pending shipments](#) 
     
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<b>DHL</b>		<b>EXP+</b>	Pieces: <b>1/1</b>
FM: DEP AIR RESOURCE MGMT P. Adams DIRECTOR OFFICE STE 23 111 S MAGNOLIADR TALLAHASSEE, FL 32301 UNITED STATES Phone: 850-921-9505		ORIGIN: <b>TLH</b> Sender's ref 37550201000	
To: NATIONAL PARK SERVICE 12795 W. ALAMEDA PARKWAY AIR DIVISION LAKEWOOD, CO 80228 UNITED STATES		POSTCODE: <b>80228</b>	
Description: PSD-FL-379 application PSD-FL-380 letter Weight: 1 lbs for 1 pcs Date: 2006-07-25 DHL standard terms and conditions apply.		TEL: 303-966-2818	Time <b>10:30</b>
 (2L)JUS90228		<b>EGEH 9E</b>	
 WAYBILL: 17127672354 (Non-Negotiable)			



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**SENDER'S RECEIPT**

Waybill #: 17127672354

To(Company):  
National Park Service  
Air Division  
12795 W. Alameda Parkway

Lakewood, CO 80228  
UNITED STATES

Attention To: Mr. John Bunyak  
Phone#: 303-966-2818

Sent By: P. Adams  
Phone#: 850-921-9505

Rate Estimate: 13.73  
Protection: Not Required  
Description: PSD-FL-379 application  
PSD-FL-380 letter

Weight (lbs.): 1  
Dimensions: 0 x 0 x 0

Ship Ref: 37550201000  
Service Level: Next Day 10:30 (Next  
business day by 10:30 A.M.)


Special Svc:

Date Printed: 7/25/2006  
Bill Shipment To: Sender  
Bill To Acct: 778941286

DHL Signature (optional) \_\_\_\_\_ Route \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

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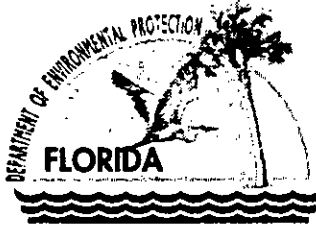
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Jeb Bush  
Governor

# Department of Environmental Protection

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

Colleen M. Castille  
Secretary

July 25, 2006

Mr. John Bunyak, Chief  
Policy, Planning & Permit Review Branch  
NPS – Air Quality Division  
P. O. Box 25287  
Denver, Colorado 80225

RE: Progress Energy Florida, Inc.  
Anclote Power Plant Helper Cooling Towers  
1010017-007-AC, PSD-FL-379

Dear Mr. Bunyak:

Enclosed for your review and comment is a PSD permit application from Progress Energy Florida, Inc. to replace two helper cooling towers at their Anclote Power Plant in Holiday, Pasco County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/921-9533. If you have any questions, please contact Bobby Bull, review engineer, at 850/921-9585.

Sincerely,

*JFK* Jeffrey F. Koerner, P.E., Administrator  
North Permitting Section


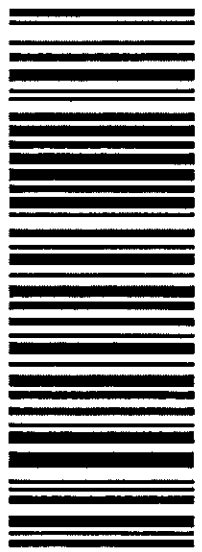
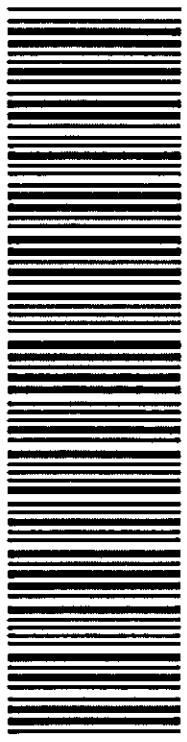
JFK/pa

Enclosure

cc: B. Bull

"More Protection. Less Process"

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		<b>GND</b>		Pieces: <b>1/1</b>
<b>FM: DEP AIR RESOURCE MGMT</b> P. Adams DIRECTOR OFFICE STE 23 111 S MAGNOLIA DR TALLAHASSEE, FL 32301 UNITED STATES Phone: 850-921-9505		<b>ORIGIN: TLH</b> Sender's ref 37550201000 A7 AP255		
<b>To: U.S. EPA REGION 4</b> MR. GREGG M. WORLEY 61 FORSYTH STREET AIR PERMITS SECTION ATLANTA, GA 30303 UNITED STATES		<b>POSTCODE: 30303</b>		
Description: PSD-FL-380 app, PSD-FL-379 app, PSD-FL-377 response Weight: 13 lbs for 1 pcs Date: 2006-07-19		TEL: 404-562-9141		
DHL standard terms and conditions apply.		<b>20TH</b> Day		
 (2L)US30303		<b>HARB 6V</b> <b>ATT</b>		
 WAYBILL: 17050352454 (Non-Negotiable)				

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<b>SENDER'S RECEIPT</b> Waybill #: 17050352454		Rate Estimate: 3.3 Protection: Not Required Description: PSD-FL-380 app, PSD-FL-379 app, PSD-FL-377 response	
To (Company): U.S. EPA Region 4 Air Permits Section 61 Forsyth Street  Atlanta, GA 30303 UNITED STATES		Weight (lbs.): 13 Dimensions: 0 x 0 x 0	
Attention To: Mr. Gregg M. Worley Phone#: 404-562-9141		Ship Ref: 37550201000 A7 AP255 Service Level: Ground (Est.) delivery in 1 business day(s)	
Sent By: P. Adams Phone#: 850-921-9505		Special Svc:  Date Printed: 7/19/2006 Bill Shipment To: Sender Bill To Acct: 778941286	

DHL Signature (optional) \_\_\_\_\_ Route \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

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Jeb Bush  
Governor

# Department of Environmental Protection

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

Colleen M. Castille  
Secretary

July 19, 2006

Mr. Gregg M. Worley, Chief  
Air Permits Section  
U.S. EPA, Region 4  
61 Forsyth Street  
Atlanta, Georgia 30303-8960

RE: Progress Energy Florida, Inc.  
Anclote Power Plant Helper Cooling Towers  
1010017-007-AC, PSD-FL-379

Dear Mr. Worley:

Enclosed for your review and comment is a PSD permit application from Progress Energy Florida, Inc. to replace two helper cooling towers at their Anclote Power Plant in Holiday, Pasco County, Florida.

Your comments may be forwarded to my attention at the letterhead address or faxed to the Bureau of Air Regulation at 850/921-9533. If you have any questions, please contact Bobby Bull, review engineer, at 850/921-9585.

Sincerely,

Jeffery F. Koerner, P.E., Administrator  
North Permitting Section

JFK/pa

Enclosure

cc: B. Bull

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Via Overnight Delivery

July 11, 2006

Mr. Jeff Koerner, PE  
Professional Engineer Administrator  
Division of Air Resource Management  
Florida Department of Environmental Protection  
2600 Blair Stone Road, M.S. 5500  
Tallahassee, Florida 32399-2400

RECEIVED

JUL 12 2006

BUREAU OF AIR REGULATION

RE: June 6, 2006 Request for Additional Information - Application for Air Construction Permit  
Florida Power Corporation dba Progress Energy Florida, Inc.  
Anclote Power Plant  
Facility ID 1010017  
Emissions Unit No. -007, Helper Cooling Towers

Dear Mr. Koerner:

Please find enclosed four (4) copies of an updated application for an air construction permit and Title V permit revision as well as a PSD report for the Florida Power Corporation dba Progress Energy Florida, Inc. ("PEF") Anclote Power Plant. As discussed with FDEP's Patty Adams today, the required \$7500 fee, which was sent under separate cover, was received by the FDEP.

As described in PEF's May 4, 2006 application, PEF is replacing two old helper cooling towers, unregulated emissions unit -007, with two new cooling towers. The enclosed documents address the needed information requested in the June 6, 2006 Florida Department of Environmental Protection letter to PEF regarding this project. Therefore, please replace the previously submitted application package with the enclosed.

Thank you for your assistance. Please let me know at (727) 820-5962, if you have any questions.

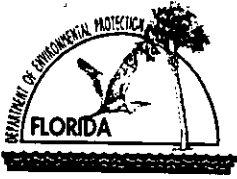
Sincerely,

A handwritten signature in black ink that reads "Ann Quillian".

Ann Quillian, PE  
Senior Environmental Specialist  
Environmental Services Section

Enclosures

cc: Ms. Mara G. Nasca, FDEP Southwest District



# Department of Environmental Protection

RECEIVED

JUL 12 2006

## Division of Air Resource Management

### APPLICATION FOR AIR PERMIT - LONG FORM

BUREAU OF AIR REGULATION

#### I. APPLICATION INFORMATION

**Air Construction Permit** – Use this form to apply for any air construction permit at a facility operating under a federally enforceable state air operation permit (FESOP) or Title V air permit. Also use this form to apply for an air construction permit:

- For a proposed project subject to prevention of significant deterioration (PSD) review, nonattainment area (NAA) new source review, or maximum achievable control technology (MACT) review; or
- Where the applicant proposes to assume a restriction on the potential emissions of one or more pollutants to escape a federal program requirement such as PSD review, NAA new source review, Title V, or MACT; or
- Where the applicant proposes to establish, revise, or renew a plantwide applicability limit (PAL).

**Air Operation Permit** – Use this form to apply for:

- An initial federally enforceable state air operation permit (FESOP); or
- An initial/revised/renewal Title V air operation permit.

**Air Construction Permit & Title V Air Operation Permit (Concurrent Processing Option)** – Use this form to apply for both an air construction permit and a revised or renewal Title V air operation permit incorporating the proposed project.

To ensure accuracy, please see form instructions.

#### Identification of Facility

1. Facility Owner/Company Name: Florida Power Corporation dba Progress Energy Florida, Inc.	
2. Site Name: Anclote Power Plant	
3. Facility Identification Number: 1010017	
4. Facility Location... Street Address or Other Locator: 1729 Baillies Bluff Road City: Holiday County: Pasco Zip Code: 34691-9753	
5. Relocatable Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6. Existing Title V Permitted Facility? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

#### Application Contact

1. Application Contact Name: Ann Quillian	
2. Application Contact Mailing Address... Organization/Firm: Progress Energy Florida, Inc. Street Address: 100 Central Avenue – CX1B City: Saint Petersburg State: FL Zip Code: 33701	
3. Application Contact Telephone Numbers... Telephone: (727) 820 - 5962 ext. Fax: (727) 820 - 5229	
4. Application Contact Email Address: Ann.Quillian@pgnmail.com	

#### Application Processing Information (DEP Use)

1. Date of Receipt of Application: 7-13-06	3. PSD Number (if applicable): PSD-FL-379
2. Project Number(s): 1010017-007-AC	4. Siting Number (if applicable):

## APPLICATION INFORMATION

### Purpose of Application

This application for air permit is submitted to obtain: (Check one)

#### **Air Construction Permit**

- Air construction permit.
- Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL).
- Air construction permit to establish, revise, or renew a plantwide applicability limit (PAL), and separate air construction permit to authorize construction or modification of one or more emissions units covered by the PAL.

#### **Air Operation Permit**

- Initial Title V air operation permit.
- Title V air operation permit revision.
- Title V air operation permit renewal.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is required.
- Initial federally enforceable state air operation permit (FESOP) where professional engineer (PE) certification is not required.

#### **Air Construction Permit and Revised/Renewal Title V Air Operation Permit (Concurrent Processing)**

- Air construction permit and Title V permit revision, incorporating the proposed project.
- Air construction permit and Title V permit renewal, incorporating the proposed project.

**Note: By checking one of the above two boxes, you, the applicant, are requesting concurrent processing pursuant to Rule 62-213.405, F.A.C. In such case, you must also check the following box:**

- I hereby request that the department waive the processing time requirements of the air construction permit to accommodate the processing time frames of the Title V air operation permit.

### Application Comment

Air construction permit application for the replacement of the unregulated emissions unit -007, helper cooling towers. The existing circulating water pumps will be reused, therefore no increase in throughput capacity.





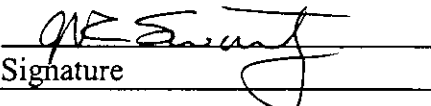
**Owner/Authorized Representative Statement**

**Complete if applying for an air construction permit or an initial FESOP.**

1. Owner/Authorized Representative Name :
2. Owner/Authorized Representative Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Owner/Authorized Representative Telephone Numbers... Telephone: ext. Fax:
4. Owner/Authorized Representative Email Address:
5. Owner/Authorized Representative Statement:  <i>I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other requirements identified in this application to which the facility is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit.</i>  _____ Signature  _____ Date

**Application Responsible Official Certification**

**Complete if applying for an initial/revised/renewal Title V permit or concurrent processing of an air construction permit and a revised/renewal Title V permit. If there are multiple responsible officials, the "application responsible official" need not be the "primary responsible official."**

1. Application Responsible Official Name: Jeffrey Swartz
2. Application Responsible Official Qualification (Check one or more of the following options, as applicable): <input checked="" type="checkbox"/> For a corporation, the president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit under Chapter 62-213, F.A.C. <input type="checkbox"/> For a partnership or sole proprietorship, a general partner or the proprietor, respectively. <input type="checkbox"/> For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official. <input type="checkbox"/> The designated representative at an Acid Rain source.
3. Application Responsible Official Mailing Address... Organization/Firm: Florida Power Corporation dba Progress Energy Florida, Inc. Street Address: 1729 Baillies Bluff Road City: Holiday State: FL Zip Code: 34691
4. Application Responsible Official Telephone Numbers... Telephone: (727) 943 - 3006 ext. Fax: (727) 943 - 3050
5. Application Responsible Official Email Address:
6. Application Responsible Official Certification: <i>I, the undersigned, am a responsible official of the Title V source addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other applicable requirements identified in this application to which the Title V source is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit. Finally, I certify that the facility and each emissions unit are in compliance with all applicable requirements to which they are subject, except as identified in compliance plan(s) submitted with this application.</i>  Signature  Date <u>7/5/06</u>

**Professional Engineer Certification**

1. Professional Engineer Name: Ann M. Quillian Registration Number: 047610
2. Professional Engineer Mailing Address... Organization/Firm: Progress Energy Florida, Inc. Street Address: 100 Central Avenue - CX1B City: Saint Petersburg State: FL Zip Code: 33701
3. Professional Engineer Telephone Numbers... Telephone: (727) 820 - 5962 ext. Fax: (727) 820 - 5229
4. Professional Engineer Email Address:
5. Professional Engineer Statement: <i>I, the undersigned, hereby certify, except as particularly noted herein*, that:</i> <i>(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and</i> <i>(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.</i> <i>(3) If the purpose of this application is to obtain a Title V air operation permit (check here <input type="checkbox"/> , if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.</i> <i>(4) If the purpose of this application is to obtain an air construction permit (check here <input type="checkbox"/> , if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here <input checked="" type="checkbox"/> , if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.</i> <i>(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here <input type="checkbox"/> , if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.</i> <i>Ann M. Quillian</i> Signature <i>6-29-06</i> Date (seal)

\* Attach any exception to certification statement.



## FACILITY INFORMATION

### Facility Regulatory Classifications

Check all that would apply *following* completion of all projects and implementation of all other changes proposed in this application for air permit. Refer to instructions to distinguish between a “major source” and a “synthetic minor source.”

1. <input type="checkbox"/> Small Business Stationary Source	<input type="checkbox"/> Unknown
2. <input type="checkbox"/> Synthetic Non-Title V Source	
3. <input checked="" type="checkbox"/> Title V Source	
4. <input checked="" type="checkbox"/> Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. <input type="checkbox"/> Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. <input checked="" type="checkbox"/> Major Source of Hazardous Air Pollutants (HAPs)	
7. <input type="checkbox"/> Synthetic Minor Source of HAPs	
8. <input type="checkbox"/> One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. <input type="checkbox"/> One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. <input type="checkbox"/> One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. <input type="checkbox"/> Title V Source Solely by EPA Designation (40 CFR 70.3(a)(5))	
12. Facility Regulatory Classifications Comment:	

# FACILITY INFORMATION

## List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
CO	A	N
NOx	A	N
PB	A	N
PM	A	N
PM10	A	N
SO2	A	N
VOC	A	N
SAM	A	N
FL	A	N
HAPS	A	N
H106	A	N
H107	A	N
H133	A	N





## FACILITY INFORMATION

### C. FACILITY ADDITIONAL INFORMATION

#### Additional Requirements for All Applications, Except as Otherwise Stated

1. Facility Plot Plan: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>05/14/2004</u>
2. Process Flow Diagram(s): (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>05/14/2004</u>
3. Precautions to Prevent Emissions of Unconfined Particulate Matter: (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Previously Submitted, Date: <u>05/14/2004</u>

#### Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable (existing permitted facility)
2. Description of Proposed Construction, Modification, or Plantwide Applicability Limit (PAL): <input checked="" type="checkbox"/> Attached, Document ID: <u>AR1</u>
3. Rule Applicability Analysis: <input checked="" type="checkbox"/> Attached, Document ID: <u>AR1 &amp; AR2</u>
4. List of Exempt Emissions Units (Rule 62-210.300(3), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable (no exempt units at facility)
5. Fugitive Emissions Identification: <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
6. Air Quality Analysis (Rule 62-212.400(7), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
7. Source Impact Analysis (Rule 62-212.400(5), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
8. Air Quality Impact since 1977 (Rule 62-212.400(4)(e), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
9. Additional Impact Analyses (Rules 62-212.400(8) and 62-212.500(4)(e), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

## FACILITY INFORMATION

### Additional Requirements for FESOP Applications

1. List of Exempt Emissions Units (Rule 62-210.300(3)(a) or (b)1., F.A.C.):  
 Attached, Document ID: \_\_\_\_\_  Not Applicable (no exempt units at facility)

### Additional Requirements for Title V Air Operation Permit Applications

1. List of Insignificant Activities (Required for initial/renewal applications only):  
 Attached, Document ID: \_\_\_\_\_  Not Applicable (revision application)
2. Identification of Applicable Requirements (Required for initial/renewal applications, and for revision applications if this information would be changed as a result of the revision being sought):  
 Attached, Document ID: \_\_\_\_\_  
 Not Applicable (revision application with no change in applicable requirements)
3. Compliance Report and Plan (Required for all initial/revision/renewal applications):  
 Attached, Document ID: \_\_\_\_\_  
Note: A compliance plan must be submitted for each emissions unit that is not in compliance with all applicable requirements at the time of application and/or at any time during application processing. The department must be notified of any changes in compliance status during application processing.
4. List of Equipment/Activities Regulated under Title VI (If applicable, required for initial/renewal applications only):  
 Attached, Document ID: \_\_\_\_\_  
 Equipment/Activities On site but Not Required to be Individually Listed  
 Not Applicable
5. Verification of Risk Management Plan Submission to EPA (If applicable, required for initial/renewal applications only) :  
 Attached, Document ID: \_\_\_\_\_  Not Applicable
6. Requested Changes to Current Title V Air Operation Permit:  
 Attached, Document ID: \_\_\_\_\_  Not Applicable

### Additional Requirements Comment

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## EMISSIONS UNIT INFORMATION

Section [ 1 ] of [ 1 ]

EU -007, HELPER COOLING TOWERS

### III. EMISSIONS UNIT INFORMATION

**Title V Air Operation Permit Application** - For Title V air operation permitting only, emissions units are classified as regulated, unregulated, or insignificant. If this is an application for Title V air operation permit, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each regulated and unregulated emissions unit addressed in this application for air permit. Some of the subsections comprising the Emissions Unit Information Section of the form are optional for unregulated emissions units. Each such subsection is appropriately marked. Insignificant emissions units are required to be listed at Section II, Subsection C.

**Air Construction Permit or FESOP Application** - For air construction permitting or federally enforceable state air operation permitting, emissions units are classified as either subject to air permitting or exempt from air permitting. The concept of an "unregulated emissions unit" does not apply. If this is an application for air construction permit or FESOP, a separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air permitting are required to be listed at Section II, Subsection C.

**Air Construction Permit and Revised/Renewal Title V Air Operation Permit Application** - Where this application is used to apply for both an air construction permit and a revised/renewal Title V air operation permit, each emissions unit is classified as either subject to air permitting or exempt from air permitting for air construction permitting purposes and as regulated, unregulated, or insignificant for Title V air operation permitting purposes. **The air construction permitting classification must be used to complete the Emissions Unit Information Section of this application for air permit.** A separate Emissions Unit Information Section (including subsections A through I as required) must be completed for each emissions unit subject to air permitting addressed in this application for air permit. Emissions units exempt from air construction permitting and insignificant emissions units are required to be listed at Section II, Subsection C.

If submitting the application form in hard copy, the number of this Emissions Unit Information Section and the total number of Emissions Unit Information Sections submitted as part of this application must be indicated in the space provided at the top of each page.

**EMISSIONS UNIT INFORMATION**  
**Section [1] of [1]**  
**EU -007, HELPER COOLING TOWERS**

**A. GENERAL EMISSIONS UNIT INFORMATION**

**Title V Air Operation Permit Emissions Unit Classification**

1. Regulated or Unregulated Emissions Unit? (Check one, if applying for an initial, revised or renewal Title V air operation permit. Skip this item if applying for an air construction permit or FESOP only.)

The emissions unit addressed in this Emissions Unit Information Section is a regulated emissions unit.

The emissions unit addressed in this Emissions Unit Information Section is an unregulated emissions unit.

**Emissions Unit Description and Status**

1. Type of Emissions Unit Addressed in this Section: (Check one)

This Emissions Unit Information Section addresses, as a single emissions unit, a single process or production unit, or activity, which produces one or more air pollutants and which has at least one definable emission point (stack or vent).

This Emissions Unit Information Section addresses, as a single emissions unit, a group of process or production units and activities which has at least one definable emission point (stack or vent) but may also produce fugitive emissions.

This Emissions Unit Information Section addresses, as a single emissions unit, one or more process or production units and activities which produce fugitive emissions only.

2. Description of Emissions Unit Addressed in this Section:  
 Helper cooling towers.

3. Emissions Unit Identification Number: -007

4. Emissions Unit Status Code: C	5. Commence Construction Date:	6. Initial Startup Date:	7. Emissions Unit Major Group SIC Code: 49	8. Acid Rain Unit? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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9. Package Unit:  
 Manufacturer: \_\_\_\_\_ Model Number: \_\_\_\_\_

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:  
 This project is to replace the existing helper cooling towers with new towers built from salt water corrosion resistant materials. The existing circulating water pumps will be reused, therefore no increase in throughput capacity will result.

**EMISSIONS UNIT INFORMATION**  
**Section [1] of [1]**  
**EU -007, HELPER COOLING TOWERS**

**Emissions Unit Control Equipment**

1. Control Equipment/Method(s) Description:  
Drift Eliminators

2. Control Device or Method Code(s): 151

**EMISSIONS UNIT INFORMATION**  
**Section [1] of [1]**  
**EU -007, HELPER COOLING TOWERS**

**B. EMISSIONS UNIT CAPACITY INFORMATION**  
**(Optional for unregulated emissions units.)**

**Emissions Unit Operating Capacity and Schedule**

1. Maximum Process or Throughput Rate: 178 E9 Gallons per Year (Sum of 2 Towers)		
2. Maximum Production Rate:		
3. Maximum Heat Input Rate: million Btu/hr		
4. Maximum Incineration Rate: pounds/hr tons/day		
5. Requested Maximum Operating Schedule:		
24 hours/day	7 days/week	
52 weeks/year	8760 hours/year	
6. Operating Capacity/Schedule Comment: The cooling towers only operate as needed during 6 to 7 months out of the year, therefore an estimated annual hours of operation of 4500 hours per year was used to calculate the throughput rate, as follows:  Max. Throughput Rate = Circulation Water Flow Rate = 660,000 GPM x 60 min/hr x 4500 hrs/yr = 178 E9 GPY This is the total for both towers, with the maximum for each tower of 89.1 E9 GPY.		

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [1]

**EU -007, HELPER COOLING TOWERS**

**C. EMISSION POINT (STACK/VENT) INFORMATION**  
 (Optional for unregulated emissions units.)

**Emission Point Description and Type**

1. Identification of Point on Plot Plan or Flow Diagram: EU 007		2. Emission Point Type Code: 3	
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking:  Cooling tower cells (Rectangular or circular)			
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:			
5. Discharge Type Code: V	6. Stack Height: 10 - 14 feet	7. Exit Diameter: 32 feet	
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: 36 E 6 acfm	10. Water Vapor: %	
11. Maximum Dry Standard Flow Rate: dscfm		12. Nonstack Emission Point Height: feet	
13. Emission Point UTM Coordinates... Zone: East (km): North (km):		14. Emission Point Latitude/Longitude... Latitude (DD/MM/SS) Longitude (DD/MM/SS)	
15. Emission Point Comment: Same number of cooling tower cells as in the old towers: 12 cells per unit or 24 cells total. The cooling tower cell height is expected to be 50 - 59 feet, with the stack height estimated to be 10 - 14 feet.			

**EMISSIONS UNIT INFORMATION**  
**Section [1] of [1]**  
**EU -007, HELPER COOLING TOWERS**

**D. SEGMENT (PROCESS/FUEL) INFORMATION**

**Segment Description and Rate:** Segment 1 of 1

1. Segment Description (Process/Fuel Type): Circulation Water		
2. Source Classification Code (SCC): 3-85-001-01		3. SCC Units: Million Gallons Cooling Water
4. Maximum Hourly Rate: 39.6	5. Maximum Annual Rate: 178,000	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: Max Hourly Rate is sum of two cooling towers. Max Annual Rate is sum of two cooling towers at 4500 hrs per year. The same circulating water pumps will be used with the new towers, therefore resulting in no increase in throughput capacity.		

**Segment Description and Rate:** Segment    of   

1. Segment Description (Process/Fuel Type):		
2. Source Classification Code (SCC):		3. SCC Units:
4. Maximum Hourly Rate:	5. Maximum Annual Rate:	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment:		





**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
 POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

(Optional for unregulated emissions units.)

**Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions**

**Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.**

1. Pollutant Emitted: PM		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 48 lb/hour                      108 tons/year		4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 0.0005% Drift Rate  Reference: Project Specification		7. Emissions Method Code: 5	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From:                      To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Emissions are the total for both cooling towers.  PTE: Water from both the Gulf of Mexico and the Anclote River mix in the inlet before the water intake. No salinity data was available, therefore assumed the same as for Crystal River of 29,000 ppm.  660,000 gpm (60min/hr) (8.34 lb/gal) (29,000 ppm) (10 E-6) (0.0005 Drift Rate/100) = 48 lb PM/hr 48 lb PM/hr (4500 hr/year) (tons/2000 lbs) = 108 TPY			
11. Potential, Fugitive, and Actual Emissions Comment: Field 4 is in reference to 4500 hours per year of operation.			

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
 ALLOWABLE EMISSIONS**

**Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.**

**Allowable Emissions** Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: Other	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: Design Drift Rate of 0.0005%	4. Equivalent Allowable Emissions: 48 lb/hour                      108 tons/year
5. Method of Compliance: Work practice.	
6. Allowable Emissions Comment (Description of Operating Method): Equivalent Allowable Emissions based on project design drift rate, 4500 hrs per year limitation and an assumed TDS of 29000 ppm.	

**Allowable Emissions** Allowable Emissions    of   

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour                      tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

**Allowable Emissions** Allowable Emissions    of   

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour                      tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

**F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION –  
 POTENTIAL, FUGITIVE, AND ACTUAL EMISSIONS**

**(Optional for unregulated emissions units.)**

**Potential, Estimated Fugitive, and Baseline & Projected Actual Emissions**

**Complete for each pollutant identified in Subsection E if applying for an air construction permit or concurrent processing of an air construction permit and a revised or renewal Title V permit. Complete for each emissions-limited pollutant identified in Subsection E if applying for an air operation permit.**

1. Pollutant Emitted: PM10		2. Total Percent Efficiency of Control:	
3. Potential Emissions: 0.4 lb/hour                      0.9 tons/year		4. Synthetically Limited? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year			
6. Emission Factor: 0.82% of PM  Reference: See Attachment EC1		7. Emissions Method Code: 5	
8.a. Baseline Actual Emissions (if required): tons/year		8.b. Baseline 24-month Period: From:                      To:	
9.a. Projected Actual Emissions (if required): tons/year		9.b. Projected Monitoring Period: <input type="checkbox"/> 5 years <input type="checkbox"/> 10 years	
10. Calculation of Emissions: Estimated that 0.82% of Total PM is PM 10 emissions per "Calculating Realistic PM10 Emissions from Cooling Towers" J.Reisman and G. Frisbie (See Attachment EC1)  PTE: Sum for both cooling towers: 48 lbs PM/hr * 0.82% = 0.4 lb/hr PM10 108 PM TPY * 0.82% = 0.9 TPY PM 10			
11. Potential, Fugitive, and Actual Emissions Comment: Field 4 is in reference to 4500 hours per year of operation.			

**F2. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION -  
 ALLOWABLE EMISSIONS**

Complete if the pollutant identified in Subsection F1 is or would be subject to a numerical emissions limitation.

**Allowable Emissions** Allowable Emissions 1 of 1

1. Basis for Allowable Emissions Code: Other	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units: Design Drift Rate of 0.0005%	4. Equivalent Allowable Emissions: 0.4 lb/hour                      0.9 tons/year
5. Method of Compliance: Work practice.	
6. Allowable Emissions Comment (Description of Operating Method): Equivalent Allowable Emissions based on project design drift rate, assumed TDS of 29000 ppm and 0.82% of Total PM.	

**Allowable Emissions** Allowable Emissions    of   

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour                      tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	

**Allowable Emissions** Allowable Emissions    of   

1. Basis for Allowable Emissions Code:	2. Future Effective Date of Allowable Emissions:
3. Allowable Emissions and Units:	4. Equivalent Allowable Emissions: lb/hour                      tons/year
5. Method of Compliance:	
6. Allowable Emissions Comment (Description of Operating Method):	



**EMISSIONS UNIT INFORMATION**

Section [1] of [1]

EU -007, HELPER COOLING TOWERS

**I. EMISSIONS UNIT ADDITIONAL INFORMATION**

**Additional Requirements for All Applications, Except as Otherwise Stated**

1. Process Flow Diagram (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input checked="" type="checkbox"/> Attached, Document ID: <u>AR1</u> <input type="checkbox"/> Previously Submitted, Date _____
2. Fuel Analysis or Specification (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____
3. Detailed Description of Control Equipment (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input checked="" type="checkbox"/> Attached, Document ID: <u>AR1</u> <input type="checkbox"/> Previously Submitted, Date _____
4. Procedures for Startup and Shutdown (Required for all operation permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable (construction application)
5. Operation and Maintenance Plan (Required for all permit applications, except Title V air operation permit revision applications if this information was submitted to the department within the previous five years and would not be altered as a result of the revision being sought) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date _____ <input checked="" type="checkbox"/> Not Applicable
6. Compliance Demonstration Reports/Records <input type="checkbox"/> Attached, Document ID: _____ Test Date(s)/Pollutant(s) Tested: _____ _____ <input type="checkbox"/> Previously Submitted, Date: _____ Test Date(s)/Pollutant(s) Tested: _____ _____ <input type="checkbox"/> To be Submitted, Date (if known): _____ Test Date(s)/Pollutant(s) Tested: _____ _____ <input checked="" type="checkbox"/> Not Applicable  Note: For FESOP applications, all required compliance demonstration records/reports must be submitted at the time of application. For Title V air operation permit applications, all required compliance demonstration reports/records must be submitted at the time of application, or a compliance plan must be submitted at the time of application.
7. Other Information Required by Rule or Statute <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

**EMISSIONS UNIT INFORMATION**

Section [ 1 ] of [ 1 ]

EU -007, HELPER COOLING TOWERS

**Additional Requirements for Air Construction Permit Applications**

1. Control Technology Review and Analysis (Rules 62-212.400(10) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e)) <input checked="" type="checkbox"/> Attached, Document ID: <u>AR1</u> <input type="checkbox"/> Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(4)(d), F.A.C., and Rule 62-212.500(4)(f), F.A.C.) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only) <input type="checkbox"/> Attached, Document ID: _____ <input checked="" type="checkbox"/> Not Applicable

**Additional Requirements for Title V Air Operation Permit Applications**

1. Identification of Applicable Requirements <input type="checkbox"/> Attached, Document ID: _____
2. Compliance Assurance Monitoring <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
3. Alternative Methods of Operation <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
4. Alternative Modes of Operation (Emissions Trading) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Not Applicable
5. Acid Rain Part Application <input type="checkbox"/> Certificate of Representation (EPA Form No. 7610-1) <input type="checkbox"/> Copy Attached, Document ID: _____ <input type="checkbox"/> Acid Rain Part (Form No. 62-210.900(1)(a)) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Repowering Extension Plan (Form No. 62-210.900(1)(a)1.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> New Unit Exemption (Form No. 62-210.900(1)(a)2.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Retired Unit Exemption (Form No. 62-210.900(1)(a)3.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Phase II NOx Compliance Plan (Form No. 62-210.900(1)(a)4.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Phase II NOx Averaging Plan (Form No. 62-210.900(1)(a)5.) <input type="checkbox"/> Attached, Document ID: _____ <input type="checkbox"/> Previously Submitted, Date: _____ <input type="checkbox"/> Not Applicable



**EMISSIONS UNIT INFORMATION**  
**Section [1] of [1]**  
**EU -007, HELPER COOLING TOWERS**

**Additional Requirements Comment**

**Attachment AR1**

**PSD Report  
Anclote Power Plant  
EU -007, HELPER COOLING TOWERS**

**1. INTRODUCTION**

Florida Power Corporation dba Progress Energy Florida, Inc. ("PEF") is proposing a project at the Anclote Power Plant (Facility ID 1010017) for the replacement of two (2) existing circular cooling towers (Emissions Unit ID -007, Helper Cooling Towers) with two (2) new fiberglass circular or rectangular once-through, counterflow, mechanical draft cooling towers. The existing towers are used to cool the water discharged from the plant in order to meet the temperature limitations of its NPDES permit. The replacement towers will be used for the same purpose.

This permit application contains the information developed to meet the Florida Department of Environmental Protection's ("FDEP") Prevention of Significant Deterioration ("PSD") requirements, including evaluation of the PSD pollutants as well as the Best Available Control Technology ("BACT") analysis. PEF is requesting an air construction permit and PSD approval as well as Title V Permit revision for this cooling tower replacement project.

**1.1 Prevention of Significant Deterioration (PSD) Requirements**

Though the helper cooling towers, Emissions Unit ID -007, are currently an unregulated emissions unit, this project to replace them requires an air construction permit as well as approval under PSD requirements. If PSD pollutant emissions from a new emissions source or an existing source that is to be modified increases more than a specific threshold, the US Environmental Protection Agency ("EPA") requirements, 40 CFR 52, as well as the FDEP regulations, Chapter 62-212, F.A.C., require the project to go through PSD review.

This cooling tower replacement project's PSD applicability analysis is summarized in Table 1.1 below. PSD review was triggered for particulate matter ("PM") only.

**Table 1.1 PSD Applicability Analysis.**

PSD Pollutant	Past Actual Emissions (TPY) <sup>a</sup>	Future Potential Emissions (TPY)	Change in Emissions (TPY)	Significant Emissions Rate Threshold (TPY)	PSD Review Required?
Particulate Matter (PM)	37	108	71	25	Yes
Particulate Matter – less than 10 µm (PM <sub>10</sub> ) <sup>b</sup>	37	0.9	-36	15	No

<sup>a</sup> Past actual emissions based on AOR emissions reported for years 2004 and 2005;

<sup>b</sup> Per the Reisman – Frisbie method, the past actual for PM<sub>10</sub> is 0.3 TPY, with a change in emissions of 0.6 TPY increase. This is still below the significant emissions rate threshold. Therefore, the project only triggers PSD for PM.

### **1.2 Best Achievable Control Technology (BACT) Analysis**

A Best Achievable Control Technology ("BACT") analysis was performed for particulate matter ("PM") as it was the only PSD pollutant to exceed the significant emissions rate threshold. The resulting proposed BACT limitation is a design drift rate of 0.0005% based on an annual water throughput rate of 178 E9 gallons per year (total for both towers) and 4500 hours per year operation.

### **1.3 Air Quality Analysis**

A Class II air quality impact analysis as well as additional analysis of impacts due to the proposed project on soils, vegetation, visibility, growth, and air quality related values (AQRV) in the nearest Class I areas were not performed because PM was the only pollutant to trigger PSD review.

## **2. PROPOSED PROJECT DESCRIPTION**

### **2.1 Site Description**

The Florida Power Corporation dba Progress Energy Florida, Inc. ("PEF") Anclote Power Plant (Facility ID 1010017) consists of two oil/natural gas fired fossil fuel steam generating ("FFSG") units with two mechanical draft helper cooling towers.

### **2.2 Proposed Project**

The proposed project involves the replacement of the two (2) existing circular cooling towers, which had been installed in the early 1980's, with new fiberglass circular or rectangular once-through, counterflow, mechanical draft cooling towers. These towers are primarily operated in the summer months (April through September), in order to reduce the discharge water canal temperature to meet current water permit requirements. This will enable PEF to reduce the number and extent of de-rates and thereby reduce replacement fuel and purchase power costs.

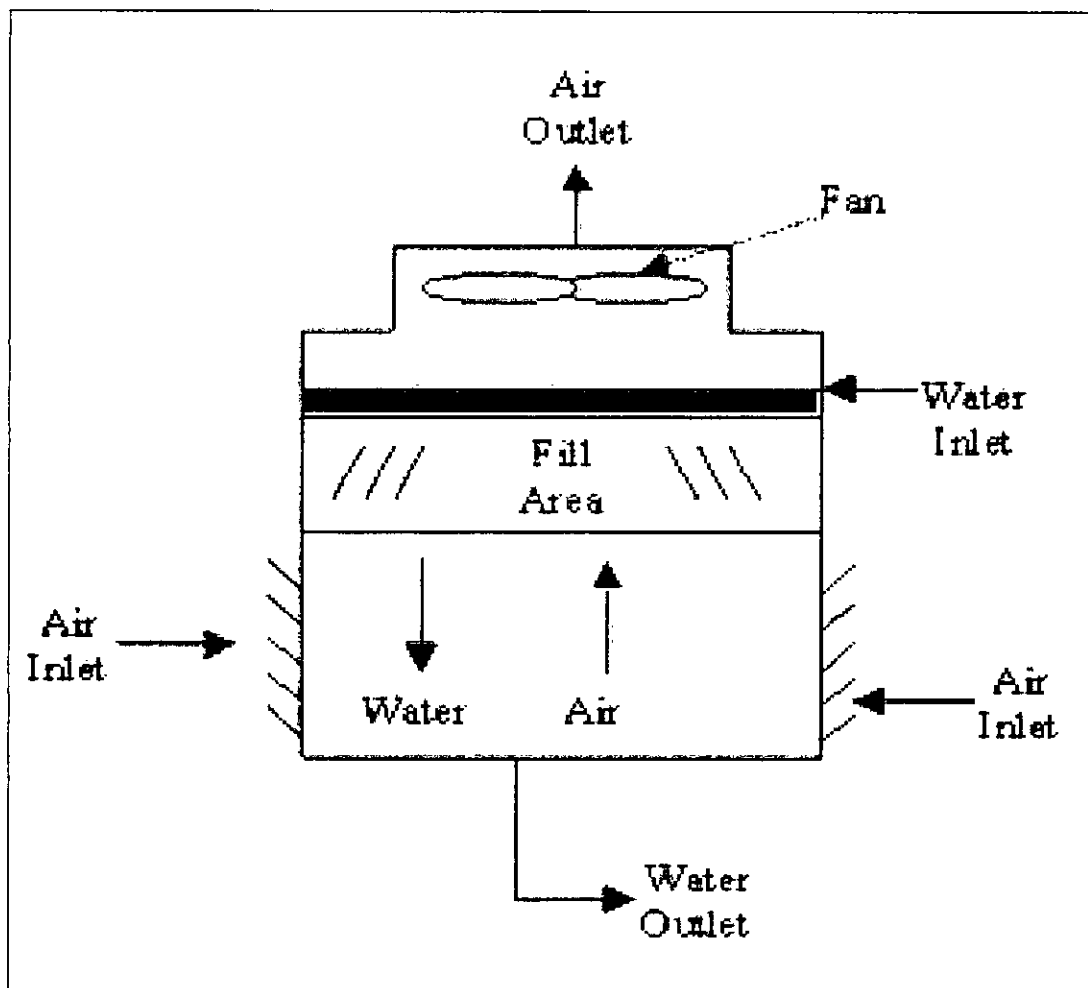
The reason for this replacement is the degraded structural condition of the existing reinforced concrete towers and the potential safety hazards to employees that it causes. The new towers will use the existing circulating water pumps, thus maintaining the same flow characteristics of the existing cooling tower system. There are two (2) potential cooling tower vendors, SPX Marley and GEA, being considered at the date of this air construction permit application.

Cooling towers provide direct contact between cooling water and air passing through the tower (see Figure 2.2). Cooling tower drift is created when a small amount of the cooling water becomes entrained in the air stream and carried out of the tower.

The PM and PM<sub>10</sub> emissions from cooling towers are related to the total dissolved solids ("TDS") in the water and amount of drift through the cooling tower. Drift eliminators are the control technology used to reduce the amount of drift, therefore reduce the amount of PM emissions.

### 2.3 Site Layout and Structures

An aerial photo showing proposed cooling tower locations follows (see Figure 2.3). If new rectangular towers are selected in lieu of replacement circular towers, they will be located near the existing towers and will utilize the existing intake and discharge points.



**Figure 2.2**  
Diagram of Typical Counterflow Mechanical Draft Cooling Tower  
(See <http://www.cheresources.com/ctowerszz.shtml>)

# Anclole Tower Replacement

**SPX Cooling Technologies**  
Baldex | Hamon Dry Cooling | Mailly

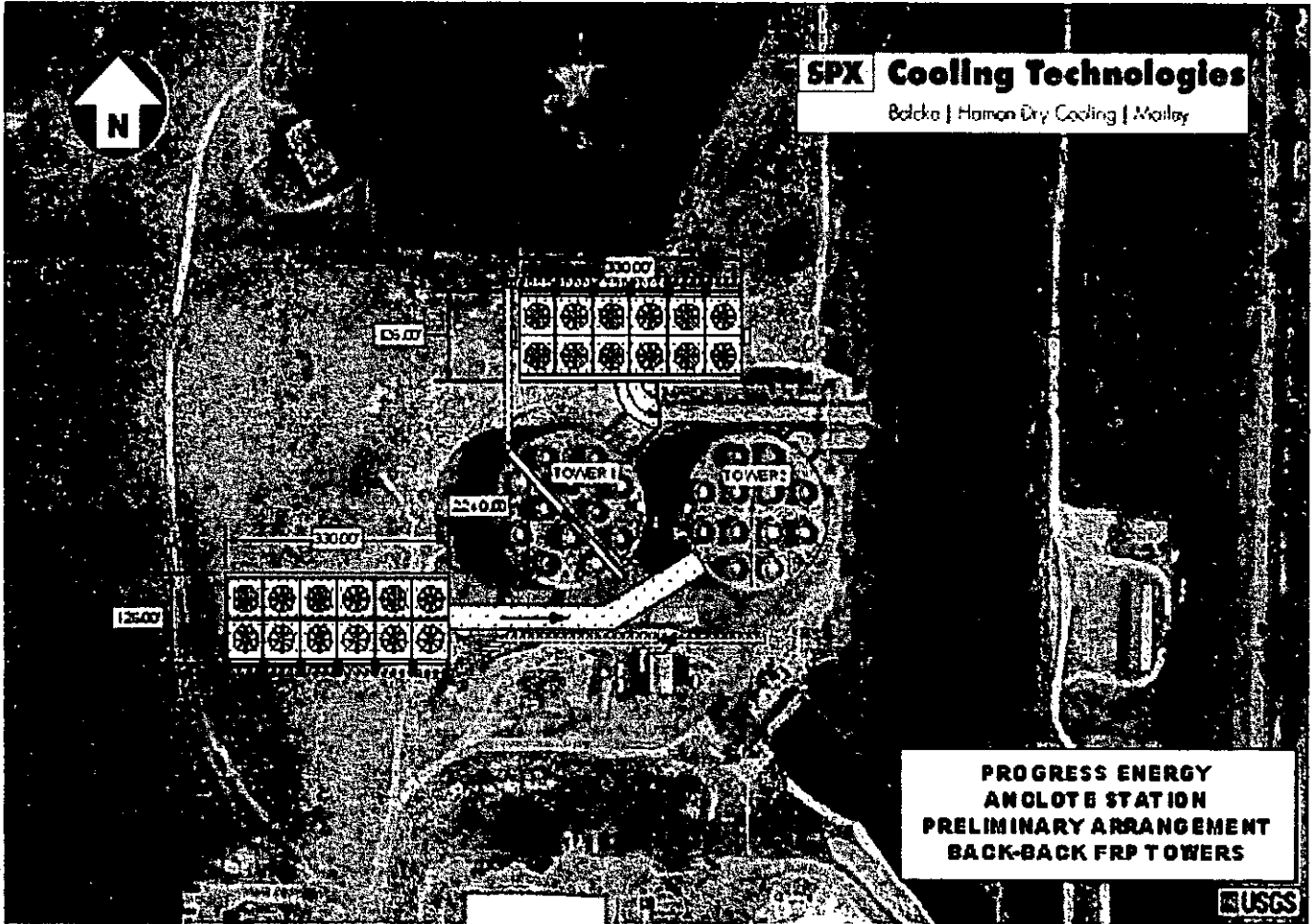


Figure 2.3  
Preliminary Cooling Tower Arrangement

### 2.4 Stack Parameters

The new replacement cooling towers will have the same number of cells as the old towers, 12 cells per unit or 24 cells total. The cooling tower cell height is expected to be 50 - 59 feet, with the stack height estimated to be 10 - 14 feet.

## 3. AIR QUALITY REVIEW REQUIREMENTS AND APPLICABILITY

### 3.1 National and State Ambient Air Quality Standards

EPA promulgated primary national ambient air quality standards ("NAAQS") to protect public health and secondary NAAQS to protect public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Attainment areas, which Florida is one, are locations of the country which meet these NAAQS.

Florida's ambient air quality standards are identical to the NAAQS (see Rule 62-204.240, F.A.C.) with the exception of sulfur dioxide which includes the 24-hour secondary standard. The NAAQS for particulate matter is as follows:

**Table 3.1. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels – Particulate Matter**

Pollutant	Averaging Time	AAQS ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>			PSD Increments ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>		PSD Class II Significant Impact Levels ( $\mu\text{g}/\text{m}^3$ ) <sup>b</sup>
		Primary Standard	Secondary Standard	Florida	Class I	Class II	
Particulate Matter <sup>c</sup> (PM <sub>10</sub> )	Annual Arithmetic Mean	50	50	50	4	17	1
	24-Hour Maximum	150	150	150	8	30	5

Note: Particulate matter (PM<sub>10</sub>) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.

<sup>a</sup> Short-term maximum concentrations are not to be exceeded more than once per year except for the PM<sub>10</sub> AAQS. The 24-hour PM<sub>10</sub> AAQS is attained when the expected number of days per year with a 24-hour concentration above 150  $\mu\text{g}/\text{m}^3$  is equal to or less than 1. For modeling purposes, compliance is based on the sixth highest 24-hour concentration over a 5-year period.

<sup>b</sup> Maximum concentrations are not to be exceeded.

<sup>c</sup> On July 18, 1997, EPA promulgated revised AAQS for particulate matter and ozone. For particulate matter, PM<sub>2.5</sub> standards were introduced with a 24-hour standard of 65  $\mu\text{g}/\text{m}^3$  (3-year average of 98th percentile) and an annual standard of 15  $\mu\text{g}/\text{m}^3$  (3-year average at community monitors).

Sources: Federal Register, Vol. 43, No. 118, June 19, 1978; 40 CFR 50; 40 CFR 52.21; Chapter 62-204, F.A.C.

### 3.2 Prevention of Significant Deterioration (PSD) Requirements

Per federal and Florida Prevention of Significant Deterioration ("PSD") review requirements, major new or modified emission sources regulated by the Clean Air Act ("CAA") must undergo review as well as obtain a pre-construction

Attachment AR1 – PSD Report  
Florida Power Corporation dba Progress Energy Florida, Inc.  
EU -007 Helper Cooling Towers  
PSD Air Construction Permit Application

permit. As Florida's EPA approved State Implementation Plan ("SIP") includes Florida's PSD requirements, the FDEP has PSD approval authority.

A "major facility" is any 1 of 28 named source categories that have the potential to emit 100 TPY or more or any other stationary facility that has the potential to emit 250 TPY or more of a PSD pollutant. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. For an existing source that is to be modified or a new source at a major facility, the proposed project would be subject to PSD review if the resulting net emissions increase (i.e. proposed future potential versus past actual emissions) is greater than the PSD significant emissions rates. Particulate matter PSD significant emission rates are 25 TPY for PM and 15 TPY for PM<sub>10</sub>. See Rule 62-210.200, F.A.C. Also, EPA has promulgated regulations providing that impacts from PSD review projects above an air quality baseline concentration level of criteria pollutants such as PM<sub>10</sub> would constitute significant deterioration of air quality. Florida has adopted the EPA class designations and allowable PSD increments (See Table 3.1 for particulate matter).

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility (see 40 CFR 51.166, Prevention of Significant Deterioration of Air Quality and Rule 62-212.400, F.A.C.). Major facilities subject to review are required to undergo the following for each PSD pollutant emitted in significant amounts:

1. Control technology review,
2. Source impact analysis,
3. Air quality analysis (monitoring),
4. Source information, and
5. Additional impact analyses.

In addition to these analyses, review with respect to good engineering practice ("GEP") stack height regulations may also be required.

Control Technology Review. Per the PSD control technology review requirements, all applicable federal and state emission-limiting standards must be met and the Best Achievable Control Technology ("BACT") applied to control emissions from the source. The BACT requirements are applicable to all regulated pollutants for which the increase in emissions from the new source or existing source modification exceeds the significant emissions rate.

Per Rule 62-210.200(38), F.A.C., Best Achievable Control Technology is defined as follows:



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*(a) An emission limitation, including a visible emissions standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case by case basis, taking into account:*

- 1. Energy, environmental and economic impacts, and other costs;*
- 2. All scientific, engineering, and technical material and other information available to the Department; and*
- 3. The emission limiting standards or BACT determinations of Florida and any other state; determines is achievable through application of production processes and available methods, systems and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of each such pollutant.*

*(b) if the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of an emissions unit or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation.*

*(c) Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results.*

*(d) In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60, 61, and 63.*

BACT requirements were promulgated within the PSD provisions in the 1977 Clean Air Act amendments [Public Law 95-95; Part C, Section 165(a)(4)]. The primary purpose of BACT is to optimize consumption of PSD air quality increments and thereby enlarge the potential for future economic growth without significantly degrading air quality (EPA, 1978; 1980). Guidelines for the evaluation of BACT can be found in *Guidelines for Determining Best Available Control Technology (BACT)* (EPA, 1978) and in the *PSD Workshop Manual* (EPA, 1980). These EPA guidelines were issued to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. However, BACT in one area may not be identical to BACT in another area. According to EPA (1980), "BACT analyses for the same types of emissions unit and the same pollutants in different locations or situations may determine that different control strategies should be applied to the different sites, depending on site-specific factors. Therefore, BACT analyses must be conducted on a case-by-case basis."

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The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed project reflect the latest in control technologies used in a particular industry and take into consideration existing and future air quality in the vicinity of the facility. BACT must, at a minimum, demonstrate compliance with applicable New Source Performance Standards ("NSPS") for a source. An evaluation of the air pollution control techniques and systems, including a cost-benefit analysis of alternative control technologies capable of achieving a higher degree of emissions reduction than the proposed control technology, is required. The cost-benefit analysis requires the documentation of the materials, energy, and economic penalties associated with the proposed and alternative control systems, as well as the environmental benefits derived from these systems. A BACT decision is to be based on sound judgment, balancing environmental benefits with energy, economic, and other impacts (EPA, 1978).

Historically, a "bottom-up" approach consistent with the BACT Guidelines and the PSD Workshop Manual has been used. With this approach, an initial control level, which is usually NSPS, is evaluated against successively more stringent controls until a BACT level is selected. Later, EPA decided that the bottom-up approach was not providing the level of BACT originally intended by the rule. As a result, in December 1987, the EPA Assistant Administrator for the Office of Air and Radiation mandated changes in the implementation of the PSD program, including a new "top-down" approach to BACT decision making.

The top-down approach begins with the most stringent (or top) technology and emission limits that have been applied elsewhere to the same or similar source category. The applicant must then provide a basis for rejecting this technology in favor of the next most stringent technology or basis for using it. Rejection of control alternatives may be based on technical or economic infeasibility. Such decisions are made on the basis of physical (e.g., fuel type), locational (e.g., availability of water), or significant differences that may exist in environmental, economic, or energy impacts. The differences between the proposed facility and the facility, for which the control technique was applied previously, must be justified. EPA has issued a draft guidance document on the top-down approach entitled *Top-Down Best Available Control Technology Guidance Document* (EPA, 1990). FDEP utilizes this "top-down" BACT approach.

Additional Impact Analysis. In addition to air quality impact analyses, PSD regulations require analysis of visibility impairment and the impacts on soils and vegetation that would occur as a result of the proposed source (see Rule 62-212.400(8), F.A.C.). Impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed for each PSD pollutant emitted in significant amounts. However since PM was the only pollutant to trigger PSD review for the helper cooling tower replacement project, no additional impact analysis was conducted.

PSD Applicability for Proposed Project.

*Area Classification.* This cooling tower replacement project at the PEF Anclote Power Plant is located in Pasco County, which is considered an attainment or maintenance area for all criteria pollutants.

*Pollutant Applicability.* The Anclote Power Plant is considered a “major existing facility” because it is 1 of the 28 named source categories and the annual emissions of several regulated pollutants are greater than 100 TPY (i.e. PM). Therefore, PSD review is required for any modification which results in a net increase greater than the PSD significant emissions rates.

As shown in Table 1.1, the comparison of the future potential-to-emit to the past actual annual emissions for the cooling tower replacement project results in a significant increase in PM emissions, but a decrease of PM<sub>10</sub> emissions. Therefore, PSD review is required for only PM.

### **3.3 Nonattainment Requirements**

Florida is considered to be in attainment with all federal and state AAQS. Therefore, there are no non-attainment areas. Hence, non-attainment new source review is not required.

### **3.4 Emission Standards**

There are no New Source Performance Standards (“NSPS”) or National Emissions Standards for Hazardous Air Pollutants (“NESHAP” and “MACT”) which apply to this cooling tower replacement project.

## **4. AMBIENT MONITORING ANALYSIS**

Per Rule 62-212.400(7), F.A.C., ambient monitoring analysis may be required as in 40 CFR 52.21(m) for a project under PSD review. A project can be exempted from monitoring if the predicted increase in ambient concentrations is less than a specific de minimis concentration for the PSD pollutant under review. Also, if PSD review is only triggered for PM, as with this cooling tower replacement project, no ambient monitoring is required.

## **5. BEST AVAILABLE CONTROL TECHNOLOGY (BACT) ANALYSIS**

### **5.1 Requirements and BACT Summary**

As previously discussed (see Section 3), Best Available Control Technology (“BACT”) must be applied for each pollutant under PSD review and BACT determinations must be made on a case-by-case basis considering technical, economic, energy, and environmental impacts for various BACT alternatives using a top-down approach.

For the Anclote Power Plant helper cooling tower replacement project, the proposed BACT for PM emissions is as follows:

**Table 5.1 Proposed BACT for Cooling Tower Replacement**

PSD Pollutant	BACT
PM	0.0005% Drift Rate <sup>a</sup>

<sup>a</sup>Based on 660,000 gpm throughput and 4500 hours per year.

**5.2 Cooling Tower BACT Analysis – Particulate Matter (PM)**

Previous BACT Determinations. As part of the BACT analysis, a review of previous PM BACT determinations for cooling towers listed in the RACT/BACT/LAER Clearinghouse on EPA's web site was performed. See Table 5.2 below. The pollution control technology was drift elimination for these determinations.

**Table 5.2: RACT/BACT/LAER Clearinghouse, Cooling Towers Permitted 6/2003 through 6/2006<sup>a</sup>**

Facility	Drift Rate (%)	Pollution Control Technology	State	Basis	Permit Date
Auburn Nugget	0.0050	(N)	IN	BACT-PSD	5/31/2005
Newmount Nevada Energy Investment, LLC	0.0005	Drift Eliminators	NV	BACT-PSD	5/5/2005
Trigen-Nassau Energy Corporation	0.0005	(N)	NY	BACT-PSD	3/31/2005
Mirant Mid-Atlantic, LLC	0.0010	Mist Eliminators	MD	BACT-PSD	11/5/2004
Longview Power, LLC	0.0002	Drift Eliminators	WV	BACT-PSD	3/2/2004
Midamerican Energy Company	0.0005	Mist Eliminators	IA	BACT-PSD	6/17/2003

<sup>a</sup> RACT/BACT/LAER Clearinghouse is on EPA's website: <http://cfpub.epa.gov/rblc/htm/bl02.cfm>.

Control Technology Feasibility. For cooling towers, drift eliminators are usually a part of the tower design in order to remove as many droplets as possible from the air stream before it exits the tower. Such drift eliminators depend on the inertial separation caused by the directional changes when passing through the eliminators.

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Common drift eliminator designs include herringbone (blade-type), wave form, and cellular (or honeycomb) configurations, with cellular units being the most efficient. Various materials can be used, including ceramics, fiber reinforced cement, fiberglass, metal, plastic, and wood installed or formed into closely spaced slats, sheets, honeycomb assemblies, or tiles. The materials may include additional features, such as corrugations and water removal channels, to enhance the removal performance. (EPA, AP42 Section 13.4, January 1995)

PM BACT Selection. For this Anclote Power Plant helper cooling tower replacement project, PEF proposes the use of drift eliminators with a design 0.0005% drift rate as the BACT limit. Note that at 660,000 gpm, 4500 hours per year, the potential-to-emit is estimated to be 108 TPY PM and 0.9 TPY PM<sub>10</sub>. Per Table 5.2, this proposed drift rate meets the current BACT for cooling towers.

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**Rule Applicability Analysis**  
**Title V Core List**  
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## **Title V Core List**

Effective: 03/01/02

[**Note:** The Title V Core List is meant to simplify the completion of the "List of Applicable Regulations" for DEP Form No. 62-210.900(1), Application for Air Permit - Long Form. The Title V Core List is a list of rules to which all Title V Sources are presumptively subject. The Title V Core List may be referenced in its entirety, or with specific exceptions. The Department may periodically update the Title V Core List.]

***Federal:*** ***(description)***

40 CFR 61, Subpart M: NESHAP for Asbestos.

40 CFR 82: Protection of Stratospheric Ozone.

40 CFR 82, Subpart B: Servicing of Motor Vehicle Air Conditioners (MVAC).

40 CFR 82, Subpart F: Recycling and Emissions Reduction.

***State:*** ***(description)***

**CHAPTER 62-4, F.A.C.: PERMITS, effective 06-01-01**

62-4.030, F.A.C.: General Prohibition.

62-4.040, F.A.C.: Exemptions.

62-4.050, F.A.C.: Procedure to Obtain Permits; Application.

62-4.060, F.A.C.: Consultation.

62-4.070, F.A.C.: Standards for Issuing or Denying Permits; Issuance; Denial.

62-4.080, F.A.C.: Modification of Permit Conditions.

62-4.090, F.A.C.: Renewals.

62-4.100, F.A.C.: Suspension and Revocation.

62-4.110, F.A.C.: Financial Responsibility.

62-4.120, F.A.C.: Transfer of Permits.

62-4.130, F.A.C.: Plant Operation - Problems.

62-4.150, F.A.C.: Review.

62-4.160, F.A.C.: Permit Conditions.

62-4.210, F.A.C.: Construction Permits.

62-4.220, F.A.C.: Operation Permit for New Sources.

**CHAPTER 62-210, F.A.C.: STATIONARY SOURCES - GENERAL REQUIREMENTS,  
effective 06-21-01**

62-210.300, F.A.C.: Permits Required.

62-210.300(1), F.A.C.: Air Construction Permits.

62-210.300(2), F.A.C.: Air Operation Permits.

62-210.300(3), F.A.C.: Exemptions.

62-210.300(5), F.A.C.: Notification of Startup.

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62-210.300(6), F.A.C.: Emissions Unit Reclassification.  
62-210.300(7), F.A.C.: Transfer of Air Permits.  
62-210.350, F.A.C.: Public Notice and Comment.  
62-210.350(1), F.A.C.: Public Notice of Proposed Agency Action.  
62-210.350(2), F.A.C.: Additional Public Notice Requirements for Emissions Units Subject to  
Prevention of Significant Deterioration or Nonattainment-Area Preconstruction Review.  
62-210.350(3), F.A.C.: Additional Public Notice Requirements for Sources Subject to Operation  
Permits for Title V Sources.

62-210.360, F.A.C.: Administrative Permit Corrections.  
62-210.370(3), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility.  
62-210.400, F.A.C.: Emission Estimates.  
62-210.650, F.A.C.: Circumvention.  
62-210.700, F.A.C.: Excess Emissions.

62-210.900, F.A.C.: Forms and Instructions.  
62-210.900(1), F.A.C.: Application for Air Permit – Title V Source, Form and Instructions.  
62-210.900(5), F.A.C.: Annual Operating Report for Air Pollutant Emitting Facility, Form and  
Instructions.  
62-210.900(7), F.A.C.: Application for Transfer of Air Permit – Title V and Non-Title V Source.

**CHAPTER 62-212, F.A.C.: STATIONARY SOURCES - PRECONSTRUCTION  
REVIEW, effective 08-17-00**

**CHAPTER 62-213, F.A.C.: OPERATION PERMITS FOR MAJOR SOURCES OF AIR  
POLLUTION, effective 04-16-01**

62-213.205, F.A.C.: Annual Emissions Fee.  
62-213.400, F.A.C.: Permits and Permit Revisions Required.  
62-213.410, F.A.C.: Changes Without Permit Revision.  
62-213.412, F.A.C.: Immediate Implementation Pending Revision Process.  
62-213.415, F.A.C.: Trading of Emissions Within a Source.  
62-213.420, F.A.C.: Permit Applications.  
62-213.430, F.A.C.: Permit Issuance, Renewal, and Revision.  
62-213.440, F.A.C.: Permit Content.  
62-213.450, F.A.C.: Permit Review by EPA and Affected States  
62-213.460, F.A.C.: Permit Shield.

62-213.900, F.A.C.: Forms and Instructions.  
62-213.900(1), F.A.C.: Major Air Pollution Source Annual Emissions Fee Form.  
62-213.900(7), F.A.C.: Statement of Compliance Form.



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**CHAPTER 62-296, F.A.C.: STATIONARY SOURCES - EMISSION STANDARDS,**  
effective 03-02-99

62-296.320(4)(c), F.A.C.: Unconfined Emissions of Particulate Matter.

62-296.320(2), F.A.C.: Objectionable Odor Prohibited.

**CHAPTER 62-297, F.A.C.: STATIONARY SOURCES - EMISSIONS MONITORING,**  
effective 03-02-99

62-297.310, F.A.C.: General Test Requirements.

62-297.330, F.A.C.: Applicable Test Procedures.

62-297.340, F.A.C.: Frequency of Compliance Tests.

62-297.345, F.A.C.: Stack Sampling Facilities Provided by the Owner of an Emissions Unit.

62-297.350, F.A.C.: Determination of Process Variables.

62-297.570, F.A.C.: Test Report.

62-297.620, F.A.C.: Exceptions and Approval of Alternate Procedures and Requirements.

**Miscellaneous:**

**CHAPTER 28-106, F.A.C.:** Decisions Determining Substantial Interests

**CHAPTER 62-110, F.A.C.:** Exception to the Uniform Rules of Procedure, effective  
07-01-98

**CHAPTER 62-256, F.A.C.:** **Open Burning and Frost Protection Fires, effective 11-30-94**

**CHAPTER 62-257, F.A.C.:** **Asbestos Notification and Fee, effective 02-09-99**

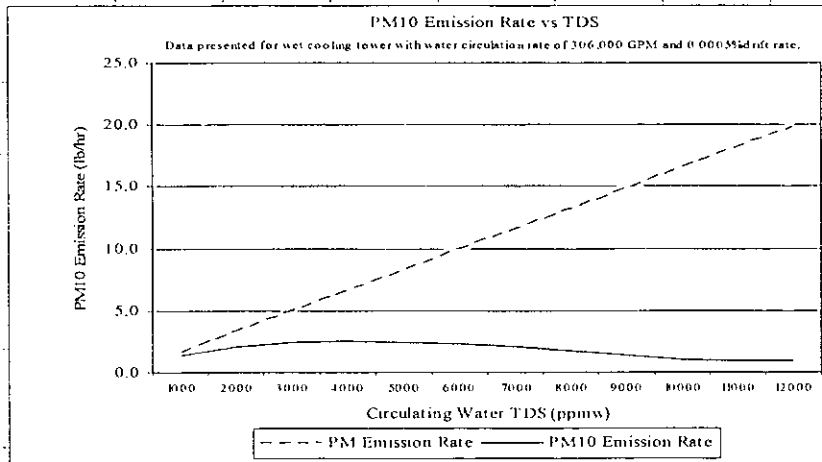
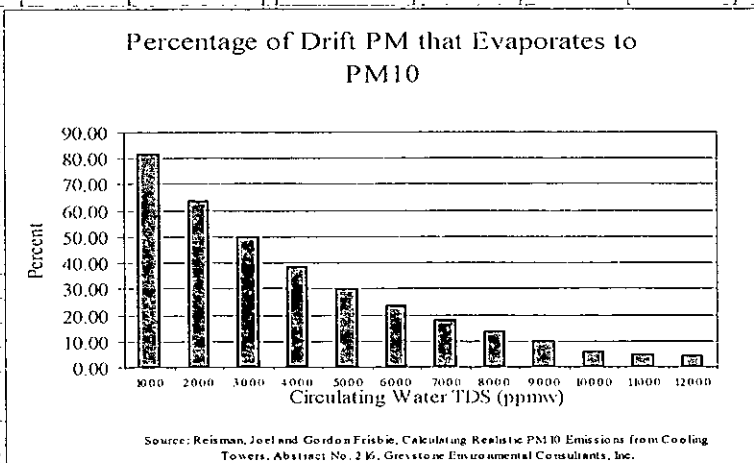
**CHAPTER 62-281, F.A.C.:** Motor Vehicle Air Conditioning Refrigerant Recovery and  
Recycling, effective 09-10-96

**Attachment EC1**

**Emission Calculation Information**  
EU -007, HELPER COOLING TOWERS

Attachment EC1 – Emission Calculation Information  
 Florida Power Corporation dba Progress Energy Florida, Inc., EU -007 Helper Cooling Towers  
 Estimate of PM10 Fraction of Cooling Tower Drift

TDS (ppmw)	PM Emission Rate (lb/hr)	Percent of Emissions < or = PM10 %	PM10 Emissions (lb/hr)	Tower Circulation Rate (GPM)	Drift Rate %	Calculated PM10 % < or = PM10 %
1000	1.65	82.04	1.355	660,000 Salt water density (lb/gal) 8.34	0.0005	82.04
2000	3.30	63.50	2.097			63.50
3000	4.95	50.00	2.477			50.00
4000	6.61	38.33	2.532			38.33
5000	8.26	29.97	2.475			29.97
6000	9.91	23.59	2.337			23.59
7000	11.56	18.20	2.104			18.20
8000	13.21	13.57	1.793			13.57
9000	14.86	9.65	1.434			9.65
10000	16.51	6.28	1.037			6.28
11000	18.16	5.11	0.928			5.11
12000	19.82	4.46	0.884			4.46
17500	28.90	1.83	0.529			1.83
29000	47.89	0.82	0.393			0.82
89600	147.96	0.22	0.326			0.22



Reisman, Joel and Gordon Frisbie, *Calculating Realistic PM10 Emissions from Cooling Towers*, Abstract No. 216, Greystone Environmental Consultants, Inc.

# Calculating Realistic PM<sub>10</sub> Emissions from Cooling Towers

Abstract No. 216      Session No. AM-1b

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## ABSTRACT

Particulate matter less than 10 micrometers in diameter (PM<sub>10</sub>) emissions from wet cooling towers may be calculated using the methodology presented in EPA's AP-42<sup>1</sup>, which assumes that all total dissolved solids (TDS) emitted in "drift" particles (liquid water entrained in the air stream and carried out of the tower through the induced draft fan stack.) are PM<sub>10</sub>. However, for wet cooling towers with medium to high TDS levels, this method is overly conservative, and predicts significantly higher PM<sub>10</sub> emissions than would actually occur, even for towers equipped with very high efficiency drift eliminators (e.g., 0.0006% drift rate). Such over-prediction may result in unrealistically high PM<sub>10</sub> modeled concentrations and/or the need to purchase expensive Emission Reduction Credits (ERCs) in PM<sub>10</sub> non-attainment areas. Since these towers have fairly low emission points (10 to 15 m above ground), over-predicting PM<sub>10</sub> emission rates can easily result in exceeding federal Prevention of Significant Deterioration (PSD) significance levels at a project's fence line. This paper presents a method for computing realistic PM<sub>10</sub> emissions from cooling towers with medium to high TDS levels.

## INTRODUCTION

Cooling towers are heat exchangers that are used to dissipate large heat loads to the atmosphere. Wet, or evaporative, cooling towers rely on the latent heat of water evaporation to exchange heat between the process and the air passing through the cooling tower. The cooling water may be an integral part of the process or may provide cooling via heat exchangers, for example, steam condensers. Wet cooling towers provide direct contact between the cooling water and air passing through the tower, and as part of normal operation, a very small amount of the circulating water may be entrained in the air stream and be carried out of the tower as "drift" droplets. Because the drift droplets contain the same chemical impurities as the water circulating through the tower, the particulate matter constituent of the drift droplets may be classified as an emission. The magnitude of the drift loss is influenced by the number and size of droplets produced within the tower, which are determined by the tower fill design, tower design, the air and water patterns, and design of the drift eliminators.

## AP-42 METHOD OF CALCULATING DRIFT PARTICULATE

EPA's AP-42<sup>1</sup> provides available particulate emission factors for wet cooling towers, however, these values only have an emission factor rating of "E" (the lowest level of confidence acceptable). They are also rather high, compared to typical present-day manufacturers' guaranteed drift rates, which are on the order of 0.0006%. (Drift emissions are typically

expressed as a percentage of the cooling tower water circulation rate). AP-42 states that “a *conservatively high* PM<sub>10</sub> emission factor can be obtained by (a) multiplying the total liquid drift factor by the TDS fraction in the circulating water, and (b) assuming that once the water evaporates, all remaining solid particles are within the PM<sub>10</sub> range.” (Italics per EPA).

If TDS data for the cooling tower are not available, a source-specific TDS content can be estimated by obtaining the TDS for the make-up water and multiplying it by the cooling tower cycles of concentration. [The cycles of concentration is the ratio of a measured parameter for the cooling tower water (such as conductivity, calcium, chlorides, or phosphate) to that parameter for the make-up water.]

Using AP-42 guidance, the total particulate emissions (PM) (after the pure water has evaporated) can be expressed as:

$$PM = \text{Water Circulation Rate} \times \text{Drift Rate} \times \text{TDS} \quad [1]$$

For example, for a typical power plant wet cooling tower with a water circulation rate of 146,000 gallons per minute (gpm), drift rate of 0.0006%, and TDS of 7,700 parts per million by weight (ppmw):

$$PM = 146,000 \text{ gpm} \times 8.34 \text{ lb water/gal} \times 0.0006/100 \times 7,700 \text{ lb solids}/10^6 \text{ lb water} \times 60 \text{ min/hr} = \underline{3.38 \text{ lb/hr}}$$

On an annual basis, this is equivalent to almost 15 tons per year (tpy). Even for a state-of-the-art drift eliminator system, this is not a small number, especially if assumed to all be equal to PM<sub>10</sub>, a regulated criteria pollutant. However, as the following analysis demonstrates, only a very small fraction is actually PM<sub>10</sub>.

## COMPUTING THE PM<sub>10</sub> FRACTION

Based on a representative drift droplet size distribution and TDS in the water, the amount of solid mass in each drop size can be calculated. That is, for a given initial droplet size, assuming that the mass of dissolved solids condenses to a spherical particle after all the water evaporates, and assuming the density of the TDS is equivalent to a representative salt (e.g., sodium chloride), the diameter of the final solid particle can be calculated. Thus, using the drift droplet size distribution, the percentage of drift mass containing particles small enough to produce PM<sub>10</sub> can be calculated. This method is conservative as the final particle is assumed to be perfectly spherical; hence as small a particle as can exist.

The droplet size distribution of the drift emitted from the tower is critical to performing the analysis. Brentwood Industries, a drift eliminator manufacturer, was contacted and agreed to provide drift eliminator test data from a test conducted by Environmental Systems Corporation (ESC) at the Electric Power Research Institute (EPRI) test facility in Houston, Texas in 1988 (Aull<sup>2</sup>, 1999). The data consist of water droplet size distributions for a drift eliminator that achieved a tested drift rate of 0.0003 percent. As we are using a 0.0006 percent drift rate, it is reasonable to expect that the 0.0003 percent drift rate would produce smaller droplets, therefore,

this size distribution data can be assumed to be conservative for predicting the fraction of PM<sub>10</sub> in the total cooling tower PM emissions.

In calculating PM<sub>10</sub> emissions the following assumptions were made:

- Each water droplet was assumed to evaporate shortly after being emitted into ambient air, into a single, solid, spherical particle.
- Drift water droplets have a density ( $\rho_w$ ) of water; 1.0 g/cm<sup>3</sup> or 1.0 \* 10<sup>-6</sup> μg / μm<sup>3</sup>.
- The solid particles were assumed to have the same density ( $\rho_{TDS}$ ) as sodium chloride, (i.e., 2.2 g/cm<sup>3</sup>).

Using the formula for the volume of a sphere,  $V = 4\pi r^3 / 3$ , and the density of pure water,  $\rho_w = 1.0 \text{ g/cm}^3$ , the following equations can be used to derive the solid particulate diameter,  $D_p$ , as a function of the TDS, the density of the solids, and the initial drift droplet diameter,  $D_d$ :

$$\text{Volume of drift droplet} = (4/3)\pi(D_d/2)^3 \quad [2]$$

$$\text{Mass of solids in drift droplet} = (\text{TDS})(\rho_w)(\text{Volume of drift droplet}) \quad [3]$$

substituting,

$$\text{Mass of solids in drift} = (\text{TDS})(\rho_w)(4/3)\pi(D_d/2)^3 \quad [4]$$

Assuming the solids remain and coalesce after the water evaporates, the mass of solids can also be expressed as:

$$\text{Mass of solids} = (\rho_{TDS})(\text{solid particle volume}) = (\rho_{TDS})(4/3)\pi(D_p/2)^3 \quad [5]$$

Equations [4] and [5] are equivalent:

$$(\rho_{TDS})(4/3)\pi(D_p/2)^3 = (\text{TDS})(\rho_w)(4/3)\pi(D_d/2)^3 \quad [6]$$

Solving for  $D_p$ :

$$D_p = D_d [(\text{TDS})(\rho_w / \rho_{TDS})]^{1/3} \quad [7]$$

Where,

TDS is in units of ppmw

$D_p$  = diameter of solid particle, micrometers ( $\mu\text{m}$ )

$D_d$  = diameter of drift droplet,  $\mu\text{m}$

Using formulas [2] – [7] and the particle size distribution test data, Table 1 can be constructed for drift from a wet cooling tower having the same characteristics as our example; 7,700 ppmw TDS and a 0.0006% drift rate. The first and last columns of this table are the particle size distribution derived from test results provided by Brentwood Industries. Using straight-line interpolation for a solid particle size 10  $\mu\text{m}$  in diameter, we conclude that approximately 14.9 percent of the mass emissions are equal to or smaller than PM<sub>10</sub>. The balance of the solid

particulate are particulate greater than 10  $\mu\text{m}$ . Hence,  $\text{PM}_{10}$  emissions from this tower would be equal to PM emissions x 0.149, or 3.38 lb/hr x 0.149 = 0.50 lb/hr. The process is repeated in Table 2, with all parameters equal except that the TDS is 11,000 ppmw. The result is that approximately 5.11 percent are smaller at 11,000 ppm. Thus, while total PM emissions are larger by virtue of a higher TDS, overall  $\text{PM}_{10}$  emissions are actually lower, because more of the solid particles are larger than 10  $\mu\text{m}$ .

**Table 1. Resultant Solid Particulate Size Distribution (TDS = 7700 ppmw)**

EPRI Droplet Diameter ( $\mu\text{m}$ )	Droplet Volume ( $\mu\text{m}^3$ ) [2] <sup>1</sup>	Droplet Mass ( $\mu\text{g}$ ) [3]	Particle Mass (Solids) ( $\mu\text{g}$ ) [4]	Solid Particle Volume ( $\mu\text{m}^3$ )	Solid Particle Diameter ( $\mu\text{m}$ ) [7]	EPRI % Mass Smaller
10	524	5.24E-04	4.03E-06	1.83	1.518	0.000
20	4189	4.19E-03	3.23E-05	14.66	3.037	0.196
30	14137	1.41E-02	1.09E-04	49.48	4.555	0.226
40	33510	3.35E-02	2.58E-04	117.29	6.073	0.514
50	65450	6.54E-02	5.04E-04	229.07	7.591	1.816
60	113097	1.13E-01	8.71E-04	395.84	9.110	5.702
70	179594	1.80E-01	1.38E-03	628.58	10.628	21.348
90	381704	3.82E-01	2.94E-03	1335.96	13.665	49.812
110	696910	6.97E-01	5.37E-03	2439.18	16.701	70.509
130	1150347	1.15E+00	8.86E-03	4026.21	19.738	82.023
150	1767146	1.77E+00	1.36E-02	6185.01	22.774	88.012
180	3053628	3.05E+00	2.35E-02	10687.70	27.329	91.032
210	4849048	4.85E+00	3.73E-02	16971.67	31.884	92.468
240	7238229	7.24E+00	5.57E-02	25333.80	36.439	94.091
270	10305995	1.03E+01	7.94E-02	36070.98	40.994	94.689
300	14137167	1.41E+01	1.09E-01	49480.08	45.549	96.288
350	22449298	2.24E+01	1.73E-01	78572.54	53.140	97.011
400	33510322	3.35E+01	2.58E-01	117286.13	60.732	98.340
450	47712938	4.77E+01	3.67E-01	166995.28	68.323	99.071
500	65449847	6.54E+01	5.04E-01	229074.46	75.915	99.071
600	113097336	1.13E+02	8.71E-01	395840.67	91.098	100.000

<sup>1</sup> Bracketed numbers refer to equation number in text.

The percentage of  $\text{PM}_{10}/\text{PM}$  was calculated for cooling tower TDS values from 1000 to 12000 ppmw and the results are plotted in Figure 1. Using these data, Figure 2 presents predicted  $\text{PM}_{10}$  emission rates for the 146,000 gpm example tower. As shown in this figure, the PM emission rate increases in a straight line as TDS increases, however, the  $\text{PM}_{10}$  emission rate increases to a maximum at around a TDS of 4000 ppmw, and then begins to decline. The reason is that at higher TDS, the drift droplets contain more solids and therefore, upon evaporation, result in larger solid particles for any given initial droplet size.

## CONCLUSION

The emission factors and methodology given in EPA's AP-42<sup>1</sup> Chapter 13.4 *Wet Cooling Towers*, do not account for the droplet size distribution of the drift exiting the tower. This is a critical factor, as more than 85% of the mass of particulate in the drift from most cooling towers will result in solid particles larger than  $\text{PM}_{10}$  once the water has evaporated. Particles larger than  $\text{PM}_{10}$  are no longer a regulated air pollutant, because their impact on human health has been shown to be insignificant. Using reasonable, conservative assumptions and a realistic drift

droplet size distribution, a method is now available for calculating realistic PM<sub>10</sub> emission rates from wet mechanical draft cooling towers equipped with modern, high-efficiency drift eliminators and operating at medium to high levels of TDS in the circulating water.

**Table 2. Resultant Solid Particulate Size Distribution (TDS = 11000 ppmw)**

EPRI Droplet Diameter (μm)	Droplet Volume (μm <sup>3</sup> ) [2] <sup>1</sup>	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm <sup>3</sup> )	Solid Particle Diameter (μm) [7]	EPRI % Mass Smaller
10	524	5.24E-04	5.76E-06	2.62	1.710	0.000
20	4189	4.19E-03	4.61E-05	20.94	3.420	0.196
30	14137	1.41E-02	1.56E-04	70.69	5.130	0.226
40	33510	3.35E-02	3.69E-04	167.55	6.840	0.514
50	65450	6.54E-02	7.20E-04	327.25	8.550	1.816
60	113097	1.13E-01	1.24E-03	565.49	10.260	5.702
70	179594	1.80E-01	1.98E-03	897.97	11.970	21.348
90	381704	3.82E-01	4.20E-03	1908.52	15.390	49.812
110	696910	6.97E-01	7.67E-03	3484.55	18.810	70.509
130	1150347	1.15E+00	1.27E-02	5751.73	22.230	82.023
150	1767146	1.77E+00	1.94E-02	8835.73	25.650	88.012
180	3053628	3.05E+00	3.36E-02	15268.14	30.780	91.032
210	4849048	4.85E+00	5.33E-02	24245.24	35.909	92.468
240	7238229	7.24E+00	7.96E-02	36191.15	41.039	94.091
270	10305995	1.03E+01	1.13E-01	51529.97	46.169	94.689
300	14137167	1.41E+01	1.56E-01	70685.83	51.299	96.288
350	22449298	2.24E+01	2.47E-01	112246.49	59.849	97.011
400	33510322	3.35E+01	3.69E-01	167551.61	68.399	98.340
450	47712938	4.77E+01	5.25E-01	238564.69	76.949	99.071
500	65449847	6.54E+01	7.20E-01	327249.23	85.499	99.071
600	113097336	1.13E+02	1.24E+00	565486.68	102.599	100.000

**Figure 1: Percentage of Drift PM that Evaporates to PM<sub>10</sub>**

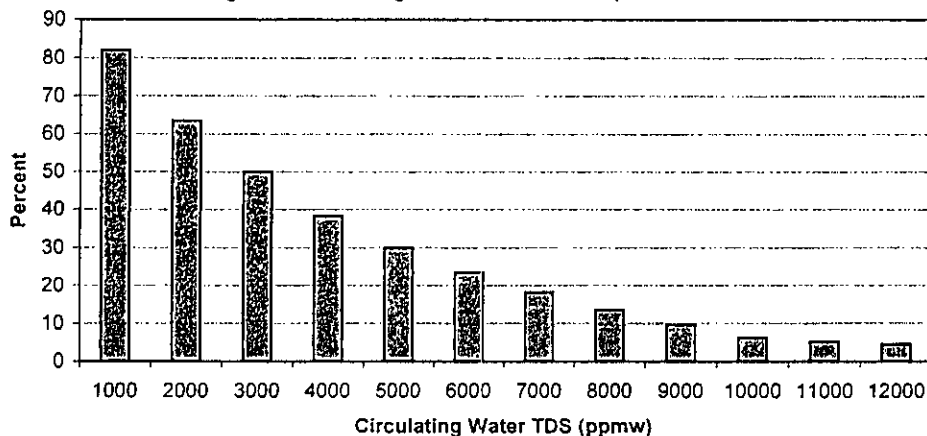
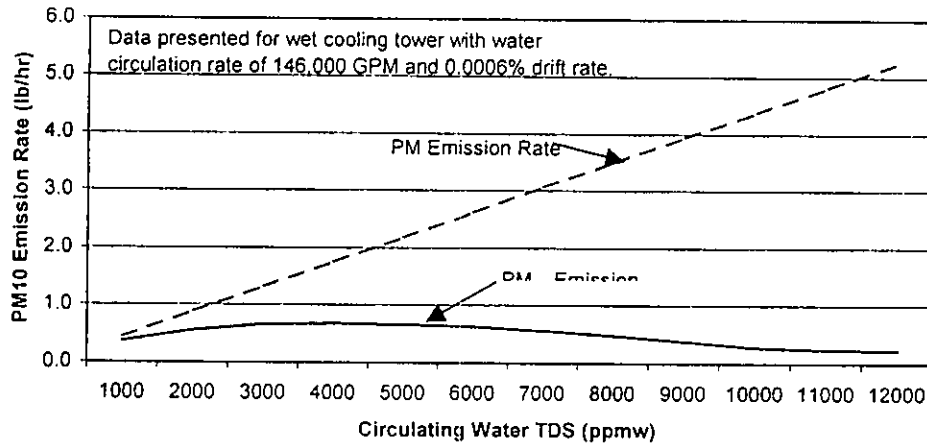




Figure 2: PM<sub>10</sub> Emission Rate vs. TDS



## REFERENCES

1. EPA, 1995. Compilation of Air pollutant Emission Factors, AP-42 Fifth edition, Volume I: *Stationary Point and Area Sources*, Chapter 13.4 Wet Cooling Towers, <http://www.epa.gov/ttn/chieff/ap42/>, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, January.
2. Aull, 1999. Memorandum from R. Aull, Brentwood Industries to J. Reisman, Greystone, December 7, 1999.

## KEY WORDS

Drift  
Drift eliminators  
Cooling tower  
PM<sub>10</sub> emissions  
TDS