Progress Energy

February 3, 2006

Mr. Jeff Koerner
DEP/DARM
North Permitting Section
Division of Air Resource Management
2600 Blair Stone Road MS 5500
Tallahassee, Florida 32399-2400

Re: Crystal River Facility – Title V Permit 0170004-009-AV
Proposed Cooling Tower Installation
Air Construction Permit and Title V Permit Revision Application

Dear Mr. Koerner:

Attached is an application for an air construction permit and Title V permit revision for the proposed cooling tower installation project we had discussed. The Crystal River power plant has had to de-rate power generating Units 1 and 2 in order to meet our discharge canal thermal limit during the summer months. In order to alleviate the power generating unit de-ratings, we are requesting an air construction permit and Title V permit revision to add additional modular cooling towers.

We have also enclosed a check in the amount of $7,500.00 to cover the application fee and would very much appreciate your expedited processing of the application as soon as possible.

Thank you for your help in this matter. Please contact me at (727) 820 5295 if you have any questions.

Sincerely,

Dave Meyer

Dave Meyer
Senior Environmental Specialist

cc: Ms. Mara Nasca, FDEP SW District (Cover Letter)

P.O. Box 14042, CX1B • St. Petersburg • Florida 33733-4042 • (727) 820-5151
A Progress Energy Company

Bxc: Ron Johnson
Cyndy Wilkinson
Richard Reiland
D. K. Meyer, CX1B (ESS Files)
Scott Osbourn, P.E., Golder Associates Inc.

Golder Associates Inc.

5100 West Lemon Street, Suite 114
Tampa, FL USA 33609
Telephone (813) 287-1717
Fax (813) 287-1716
www.golder.com

PSD PERMIT APPLICATION
COOLING TOWER INSTALLATION
CRYSTAL RIVER ENERGY COMPLEX
CRYSTAL RIVER, CITRUS COUNTY, FLORIDA

Submitted to:

Progress Energy Florida
100 Central Avenue
St. Petersburg, Florida 33701

Submitted by:

Golder Associates Inc.
5100 West Lemon Street
Suite 114
Tampa, Florida 33609

Distribution:

4 Copies	Department of Environmental Protection
2 Copies	Progress Energy Florida
2 Copies	Golder Associates Inc.

February 2006

053-9582

PART I – FDEP APPLICATION FOR AIR PERMIT
PART II – PSD APPLICATION

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

PART I

FDEP APPLICATION FOR AIR PERMIT

Department of Environmental Protection

Division of Air Resource Management

APPLICATION FOR AIR PERMIT - LONG FORM

I. APPLICATION INFORMATION

Air Construction Permit – 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
- at an existing federally enforceable state air operation permit (FESOP) or Title V permitted facility.

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 & Revised/Renewal 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: **PROGRESS ENERGY FLORIDA, INC.**	
2. Site Name: **CRYSTAL RIVER POWER PLANT**	
3. Facility Identification Number:	
4. Facility Location...: Street Address or Other Locator: **NORTH OF CRYSTAL RIVER, WEST OF U.S. 19** City: **CRYSTAL RIVER** County: **CITRUS** Zip Code: **34428**	
5. Relocatable Facility? ☐ Yes ☒ No	6. Existing Title V Permitted Facility? ☒ Yes ☐ No

Application Contact

1. Application Contact Name: **DAVE MEYER, SENIOR ENVIRONMENTAL SPECIALIST**
2. Application Contact Mailing Address... Organization/Firm: **PROGRESS ENERGY FLORIDA** Street Address: **100 CENTRAL AVE CX1B** City: **ST. PETERSBURG** State: **FL** Zip Code: **33701**
3. Application Contact Telephone Numbers... Telephone: **(727) 820-5295** ext. Fax: **(727) 820-5229**
4. Application Contact Email Address: **DAVE.MEYER@PGNMAIL.COM**

Application Processing Information (DEP Use)

1. Date of Receipt of Application:	2-6-06
2. Project Number(s):	0170004-010-AC, 0170004-011-AV
3. PSD Number (if applicable):	PSD-FL-370
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 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

Progress Energy is proposing to install modular cooling towers at the Crystal River Power Plant. See Part II for details of proposed cooling tower project.

APPLICATION INFORMATION

Scope of Application

Emissions Unit ID Number	Description of Emissions Unit	Air Permit Type	Air Permit Proc. Fee
020	Mechanical Draft Cooling Towers		NA

Application Processing Fee

Check one: ☒ Attached - Amount: $__7,500_____ ☐ Not Applicable

APPLICATION INFORMATION

Owner/Authorized Representative Statement

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

1. Owner/Authorized Representative Name :
   BERNIE CUMBIE, PLANT MANAGER
2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: **PROGRESS ENERGY**
   Street Address: **100 CENTRAL AVE CN77**
   City: **ST PETERSBURG** State: **FLORIDA** Zip Code: **33701**
3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(352) 563-4484** ext. Fax: **(352) 563-4496**
4. Owner/Authorized Representative Email Address: **BERNE.CUMBIE@PGNMAIL.COM**
5. Owner/Authorized Representative Statement:

   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.

Bernie McCumbie — Signature

2/2/06 — Date

APPLICATION INFORMATION

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:

2. Application Responsible Official Qualification (Check one or more of the following options, as applicable):
   - ☐ 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.
   - ☐ For a partnership or sole proprietorship, a general partner or the proprietor, respectively.
   - ☐ For a municipality, county, state, federal, or other public agency, either a principal executive officer or ranking elected official.
   - ☐ The designated representative at an Acid Rain source.

3. Application Responsible Official Mailing Address...
   Organization/Firm:
   Street Address:
   City: State: Zip Code:

4. Application Responsible Official Telephone Numbers...
   Telephone: ( ) - ext. Fax: ( ) -

5. Application Responsible Official Email Address:

6. Application Responsible Official Certification:

   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.

   Signature Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **SCOTT OSBOURN**
   Registration Number: **57557**
2. Professional Engineer Mailing Address...
   Organization/Firm: **Golder Associates Inc.****
   Street Address: **5100 West Lemon St., Suite 114**
   City: **Tampa** State: **FL** Zip Code: **33609**
3. Professional Engineer Telephone Numbers...
   Telephone: **(813) 287-1717** ext.**211** Fax: **(813) 287-1716**
4. Professional Engineer Email Address: **SOSBOURN@GOLDER.COM**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(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

(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.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, 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.

(4) If the purpose of this application is to obtain an air construction permit (check here ☐, 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 ☒, 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.

(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 ☐, 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.

Signature Date 2/3/06

(seal)

SCOTT OSBOURN LICENSE NO. 57557 STATE OF FLORIDA PROFESSIONAL ENGINEER

* Attach any exception to certification statement.
**** Board of Professional Engineers Certificate of Authorization #00001670**

II. FACILITY INFORMATION

A. GENERAL FACILITY INFORMATION

Facility Location and Type

1. Facility UTM Coordinates... Zone **17** East (km) **334.3** North (km) **3204.5**		2. Facility Latitude/Longitude... Latitude (DD/MM/SS) **28/57/34** Longitude (DD/MM/SS) **82/42/01**	
3. Governmental Facility Code: **0**	4. Facility Status Code: **A**	5. Facility Major Group SIC Code: **49**	6. Facility SIC(s):
7. Facility Comment :			

Facility Contact

1. Facility Contact Name: **DAVE MEYER, SENIOR ENVIRONMENTAL SPECIALIST**
2. Facility Contact Mailing Address... Organization/Firm: **PROGRESS ENERGY** Street Address: **100 CENTRAL AVE CX1B** City: **ST PETERSBURG** State: **FLORIDA** Zip Code: **33701**
3. Facility Contact Telephone Numbers: Telephone: **(727) 820-5295** ext. Fax: **(727) 820-5229**
4. Facility Contact Email Address: **DAVE.MEYER@PGNMAIL.COM**

Facility Primary Responsible Official

Complete if an "application responsible official" is identified in Section I. that is not the facility "primary responsible official."

1. Facility Primary Responsible Official Name:
2. Facility Primary Responsible Official Mailing Address... Organization/Firm: Street Address: City: State: Zip Code:
3. Facility Primary Responsible Official Telephone Numbers... Telephone: ( ) - ext. Fax: ( ) -
4. Facility Primary Responsible Official Email Address:

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. ☐ Small Business Stationary Source	☐ Unknown
2. ☐ Synthetic Non-Title V Source	
3. ☒ Title V Source	
4. ☒ Major Source of Air Pollutants, Other than Hazardous Air Pollutants (HAPs)	
5. ☐ Synthetic Minor Source of Air Pollutants, Other than HAPs	
6. ☒ Major Source of Hazardous Air Pollutants (HAPs)	
7. ☐ Synthetic Minor Source of HAPs	
8. ☒ One or More Emissions Units Subject to NSPS (40 CFR Part 60)	
9. ☐ One or More Emissions Units Subject to Emission Guidelines (40 CFR Part 60)	
10. ☐ One or More Emissions Units Subject to NESHAP (40 CFR Part 61 or Part 63)	
11. ☐ 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
FL	A	N
H001	C	N
H015	C	N
H017	C	N
H020	C	N
H027	C	N
H046	C	N
H054	C	N
H106	C	N
H107	A	N
H109	C	N
H118	C	N
H150	C	N
H162	A	N
HAPS	A	N
NOx	A	N
PB	A	N
PM	A	N

FACILITY INFORMATION

List of Pollutants Emitted by Facility

1. Pollutant Emitted	2. Pollutant Classification	3. Emissions Cap [Y or N]?
PM10	A	N
SO2	A	N
TH	C	N
VOC	A	N

B. EMISSIONS CAPS

Facility-Wide or Multi-Unit Emissions Caps

1. Pollutant Subject to Emissions Cap	2. Facility Wide Cap [Y or N]? (all units)	3. Emissions Unit ID No.s Under Cap (if not all units)	4. Hourly Cap (lb/hr)	5. Annual Cap (ton/yr)	6. Basis for Emissions Cap

7. Facility-Wide or Multi-Unit Emissions Cap Comment:

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) ☐ Attached, Document ID:____ ☒ Previously Submitted, Date:____
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) ☐ Attached, Document ID:____ ☒ Previously Submitted, Date:____
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) ☐ Attached, Document ID:____ ☒ Previously Submitted, Date:____

Additional Requirements for Air Construction Permit Applications

1. Area Map Showing Facility Location: ☐ Attached, Document ID:____ ☒ Not Applicable (existing permitted facility)
2. Description of Proposed Construction or Modification: ☒ Attached, Document ID:**PART II**
3. Rule Applicability Analysis: ☒ Attached, Document ID:**PART II**
4. 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)
5. Fugitive Emissions Identification (Rule 62-212.400(2), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
6. Preconstruction Air Quality Monitoring and Analysis (Rule 62-212.400(5)(f), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
7. Ambient Impact Analysis (Rule 62-212.400(5)(d), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
8. Air Quality Impact since 1977 (Rule 62-212.400(5)(h)5., F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
9. Additional Impact Analyses (Rules 62-212.400(5)(e)1. and 62-212.500(4)(e), F.A.C.): ☐ Attached, Document ID:____ ☒ Not Applicable
10. Alternative Analysis Requirement (Rule 62-212.500(4)(g), F.A.C.): ☐ Attached, Document ID:____ ☒ 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

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]
RENTAL 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: **MECHANICAL DRAFT COOLING TOWERS**

3. Emissions Unit Identification Number: **EU20**

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? ☐ Yes ☒ No

9. Package Unit:
Manufacturer: **Aggreko or Tower Tech** Model Number: **Unknown**

10. Generator Nameplate Rating: MW

11. Emissions Unit Comment:

EMISSIONS UNIT INFORMATION
Section [1]
RENTAL COOLING TOWERS

Emissions Unit Control Equipment

1. Control Equipment/Method(s) Description:
   DRIFT ELIMINATORS

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

B. EMISSIONS UNIT CAPACITY INFORMATION

(Optional for unregulated emissions units.)

Emissions Unit Operating Capacity and Schedule

1. Maximum Process or Throughput Rate: **32.4E9 Gallons per year**	
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:	
24hours/day	**7**days/week
52weeks/year	**8760**hours/year

6. Operating Capacity/Schedule Comment:

Throughput rate = circulation water flow rate = 180,000 GPM x 60 min/hr x 3,000 hours of maximum operation per year = 32.4E9 gallons per year.

Since the emissions from the cooling tower are directly related to the amount of circulation water through the tower, it is proposed that the facility be restricted to an annual circulation water consumption of 32.4E9 gallons and not hours per year operational limit. Limiting the facility in this manner gives the facility operational flexibility while maintaining assurance that the actual PM emissions are within the limits defined in this application.

EMISSIONS UNIT INFORMATION
Section [1]
RENTAL 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: **EU020**		2. Emission Point Type Code: **3**
3. Descriptions of Emission Points Comprising this Emissions Unit for VE Tracking: **Rectangular cooling tower cells.**		
4. ID Numbers or Descriptions of Emission Units with this Emission Point in Common:		
5. Discharge Type Code: **V**	6. Stack Height: **22** feet	7. Exit Diameter: **9.6 or 11** feet
8. Exit Temperature: °F	9. Actual Volumetric Flow Rate: **25,000** 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:
Number of cooling towers equal 71 or 72 cooling tower cells depending on chosen vendor, Aggreko or Tower Tech, respectively. See Part II, Table 2-1.

Cooling tower cell height equals 11 feet. Stack height estimated equal to 2 x cell height = 22 feet.

EMISSIONS UNIT INFORMATION
Section [1]
RENTAL 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. SCC Units: **Thousand Gallons Water**	
4. Maximum Hourly Rate: **10,800**	5. Maximum Annual Rate: **32,400,000**	6. Estimated Annual Activity Factor:
7. Maximum % Sulfur:	8. Maximum % Ash:	9. Million Btu per SCC Unit:
10. Segment Comment: **Hourly rate based on 180,000 GPM** **Annual rate based on 3,000 per year**		

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:		

E. EMISSIONS UNIT POLLUTANTS

List of Pollutants Emitted by Emissions Unit

1. Pollutant Emitted	2. Primary Control Device Code	3. Secondary Control Device Code	4. Pollutant Regulatory Code
PM	151		WP
PM10	151		WP

F1. EMISSIONS UNIT POLLUTANT DETAIL INFORMATION – POTENTIAL/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive 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: **35.1** lb/hour **52.7** tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: **See Part II** Reference:	7. Emissions Method Code: **0**
8. Calculation of Emissions: **See Table 1 of Part II**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **NA**	4. Equivalent Allowable Emissions: **35.1**lb/hour **52.7**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):	

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/ESTIMATED FUGITIVE EMISSIONS

(Optional for unregulated emissions units.)

Potential/Estimated Fugitive 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: **2.13**lb/hour **3.2**tons/year	4. Synthetically Limited? ☒ Yes ☐ No
5. Range of Estimated Fugitive Emissions (as applicable): to tons/year	
6. Emission Factor: Reference:	7. Emissions Method Code: **0**
8. Calculation of Emissions: **See Table 1 of Part II.**	
9. Pollutant Potential/Estimated Fugitive Emissions Comment:	

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: **NA**	4. Equivalent Allowable Emissions: **2.13**lb/hour **3.2**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):	

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):	

G. VISIBLE EMISSIONS INFORMATION

Complete if this emissions unit is or would be subject to a unit-specific visible emissions limitation.

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

Visible Emissions Limitation: Visible Emissions Limitation _____ of _____

1. Visible Emissions Subtype:	2. Basis for Allowable Opacity: ☐ Rule ☐ Other
3. Allowable Opacity: Normal Conditions: % Exceptional Conditions: % Maximum Period of Excess Opacity Allowed: min/hour	
4. Method of Compliance:	
5. Visible Emissions Comment:	

EMISSIONS UNIT INFORMATION
Section [1]
RENTAL 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)
   ☒ Attached, Document ID: **See Part II** ☐ 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)
   ☐ Attached, Document ID: _____ ☐ 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)
   ☒ Attached, Document ID: **See Part II** ☐ 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)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☒ 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)
   ☐ Attached, Document ID: _____ ☐ Previously Submitted, Date _____
   ☒ Not Applicable

6. Compliance Demonstration Reports/Records
   ☐ Attached, Document ID: _____
   Test Date(s)/Pollutant(s) Tested: _____
   ☐ Previously Submitted, Date: _____
   Test Date(s)/Pollutant(s) Tested: _____
   ☐ To be Submitted, Date (if known): _____
   Test Date(s)/Pollutant(s) Tested: _____
   ☒ 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
   ☐ Attached, Document ID: _____ ☒ Not Applicable

EMISSIONS UNIT INFORMATION
Section [1]
RENTAL COOLING TOWERS

Additional Requirements for Air Construction Permit Applications

1. Control Technology Review and Analysis (Rules 62-212.400(6) and 62-212.500(7), F.A.C.; 40 CFR 63.43(d) and (e))
   ☒ Attached, Document ID: **See Part II** ☐ Not Applicable
2. Good Engineering Practice Stack Height Analysis (Rule 62-212.400(5)(h)6., F.A.C., and Rule 62-212.500(4)(f), F.A.C.)
   ☐ Attached, Document ID: ____ ☒ Not Applicable
3. Description of Stack Sampling Facilities (Required for proposed new stack sampling facilities only)
   ☐ Attached, Document ID: ____ ☒ Not Applicable

Additional Requirements for Title V Air Operation Permit Applications

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

EMISSIONS UNIT INFORMATION
Section [1]
RENTAL COOLING TOWERS

Additional Requirements Comment

PART II

PSD APPLICATION

1.0 INTRODUCTION AND EXECUTIVE SUMMARY

The proposed Project involves installation and operation of modular cooling towers in the summer months (mid-May through mid-September) in order to reduce the discharge canal temperature. This will enable PEF to reduce the number and extent of de-rates and thereby reduce replacement fuel and purchase power costs. In addition, these towers will provide further redundancy and serve as back-up in the event of malfunction of the primary towers.

This application contains the technical information developed in accordance with Prevention of Significant Deterioration (PSD) regulations as promulgated by the Florida Department of Environmental Protection (FDEP). It presents an evaluation of regulated pollutants subject to PSD review, and a demonstration of Best Available Control Technology (BACT). Through this application, Progress Energy Florida (PEF) requests that FDEP issue an air construction permit and PSD approval for this Project.

1.1 PSD Requirements

The permitting of this Project in Florida requires an air construction permit and PSD approval. The Project will be a modification to an existing major air emissions source. The U.S. Environmental Protection Agency (EPA) has implemented regulations requiring PSD review for new or modified sources that increase air emissions above certain threshold amounts.

EPA's PSD regulations are promulgated under Title 40 of the Code of Federal Regulations (CFR), Part 52.21, and are implemented in Florida through the approved PSD program of the FDEP. FDEP has adopted PSD regulations codified in Rule 62-212.400, Florida Administrative Code (F.A.C.).

PSD applicability for the Project is summarized below.

Pollutant	Annual Emissions (TPY)	PSD Threshold (TPY)	PSD Review Required (Y/N)
PM	52.7	25	Y
PM10	3.2	15	N

A PSD review is required for Particulate matter (PM) as total suspended particulate matter (TSP).

Citrus County has been designated as an attainment, maintenance or unclassifiable area for all criteria pollutants. The county is also classified as a PSD Class II area for PM_{10}, SO_2, and NO_2. Therefore, the new source review will follow PSD regulations pertaining to such designations.

1.2 BACT Analysis

For the proposed Project, a BACT analysis was conducted for each pollutant for which the net increase exceeds the FDEP significance emission rate and, is therefore, subject to BACT review. The proposed BACT emission levels are as follow:

Proposed BACT Emission Levels

Pollutant	Modular Cooling Tower BACT (%Drift Rate)	Annual Circulation Water Consumption (Gallons/yr)
PM	0.0015	32.4E9

Air Quality Analysis

Because PM was the only pollutant that triggered PSD review, 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 (AQRVs) in the nearest PSD Class I areas were not conducted.

2.0 PROJECT DESCRIPTION

2.1 Site Description

The Crystal River Energy Complex consists of four coal-fired fossil fuel steam generating (FFSG) units with electrostatic precipitators; two natural draft cooling towers for FFSG Units 4 and 5; helper mechanical cooling towers for FFSG Units 1, 2 and Nuclear Unit 3; coal, fly ash, and bottom ash handling facilities, and relocatable diesel fired generator(s).

2.2 Proposed Project Modifications

The Project involves installation and operation of modular cooling towers, primarily in the summer months (mid-May through mid-September), in order to reduce the discharge canal temperature.

2.3 Proposed Cooling Tower Emissions

Wet cooling towers provide direct contact between cooling water and air passing through the tower. Cooling tower drift is created when small amount of the cooling water becomes entrained in the air stream and carried out of the tower. PM emissions from cooling towers are related to the total dissolved solids (TDS) and amount of drift through the cooling tower. Drift eliminators are the control technology used to reduce the amount of drift and secondarily reduce the amount of PM emissions. The estimated PM and PM_{10} emissions from the proposed cooling towers are presented in Table 2-1. As shown in Table 2-1, there are two potential cooling tower vendors, Aggreko and Tower Tech. When the final vendor is chosen PEF will notify FDEP. If Aggreko is chosen as the vendor, 71 tower cells with two different cell dimensions will makeup the project. If Tower Tech is chosen, 72 identical tower cells will makeup the project. Appendix A presents a description of the methodology and data used to estimate the fraction of PM emissions constitute PM_{10}.

2.4 Site Layout and Structures

A plot plan of the Project, showing cooling tower locations, is presented in Figure 2-1. The rental cooling towers will be located nearby the existing towers and will utilize the existing intake and discharge points. Appendix B provided vendor data the proposed Aggreko cooling towers. The Tower Tech design will be identical to the R-360 Aggreko model.

2.5 Stack Parameters

Stack parameters for the Project are presented in Table 2-1.

Table 2-1. Physical, Performance, and Emissions Data for the Mechanical Draft Cooling Towers

Parameter	Aggreko	OR	Tower Tech
Physical Data			
Number of Cells	71		72
Deck Dimensions, ft			
Length	47 cells @ 30ft and 24 cells at 24ft		30
Width	12		12
Height(Tower Height)	11		11
Stack Dimensions			
Height, ft	TBD		TBD
Stack Top Effective Inner Diameter, per cell, ft	11 and 9.6		11
Effective Diameter, all cells, ft	87.1		90.9
Performance Data (per cell)			
Discharge Velocity, ft/min	87		69
Circulating Water Flow Rate (CWFR), gal/min	180,000		180,000
Design hot water temperature, °F	140		140
Design Air Flow Rate per cell, acfm, (estimated)	25,000		25,000
Hours of operation	3,000		3,000
Emission Data			
Drift Rate [a] (DR), percent	0.0015		0.0015
Total Dissolved Solids (TDS) Concentration [b], average ppm	25,307		25,307
Solution Drift [c] (SD), lb/hr	1,388.3		1,388.3
PM Drift [d], lb/hr	35.1		35.1
tons/year	52.7		52.7
PM_{10} Drift[e]			
PM_{10} Emissions, lb/hr	2.13		2.13
tons/year	3.2		3.2

[a] Drift rate is the percent of circulating water.

[b] A TDS of 25,307 Average Value from Historical Data (Ron Johnson email 12/13/05)

[c] Includes water and based on circulating water flow rate and drift rate (CWFR x DR x 8.57 lb/gal x 60 min/hr).

[d] PM calculated based on total dissolved solids and solution drift (TDS x SD).

[e] PM_{10} based on Cooling Tower PM_{10} emissions study see Attachment A.

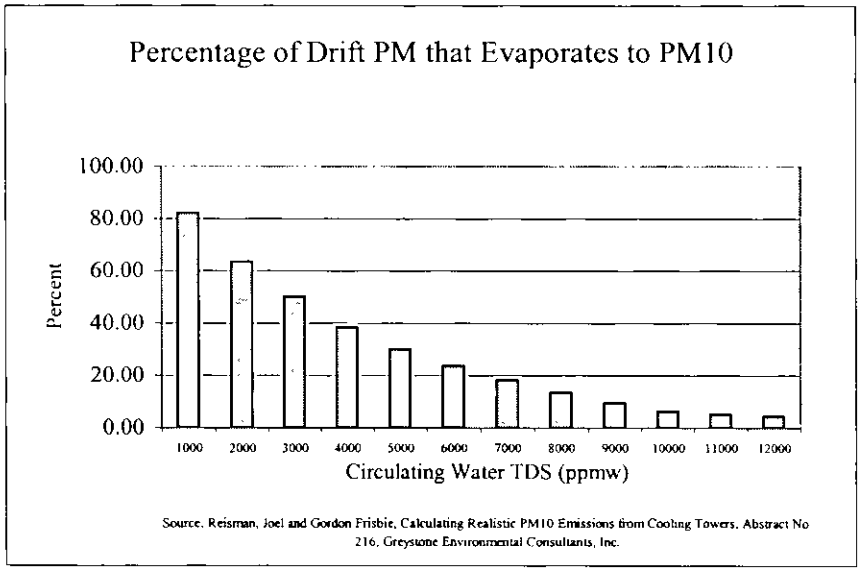
Source: Progress Energy, 2006; Golder, 2006.

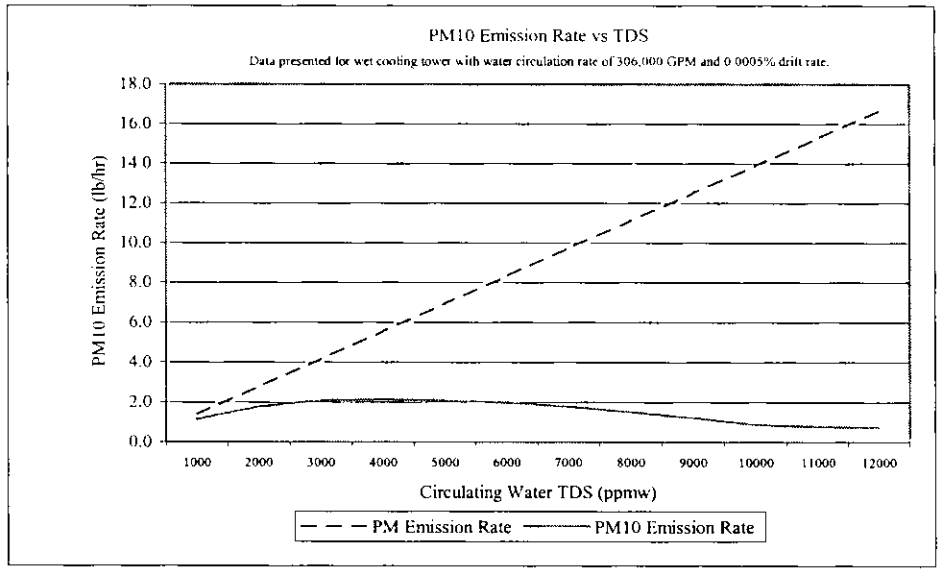
TDS (ppmw)	PM Emission Rate (lb/hr)	Percent of Emissions < or = PM10 %	PM10 Emissions (lb/hr)
1000	1.39	82.04	1.139
2000	2.78	63.50	1.763
3000	4.17	50.00	2.083
4000	5.55	38.33	2.129
5000	6.94	29.97	2.080
6000	8.33	23.59	1.965
7000	9.72	18.20	1.769
8000	11.11	13.57	1.507
9000	12.50	9.65	1.206
10000	13.88	6.28	0.872
11000	15.27	5.11	0.780
12000	16.66	4.46	0.743
25307	35.13	1.07	0.376
29000	40.26	0.82	0.330
89600	124.40	0.22	0.274

Tower Circulation Rate (GPM)	Drift Rate %
180,000	0.0015

	Salt water density (lb/gal)
swd	8.57

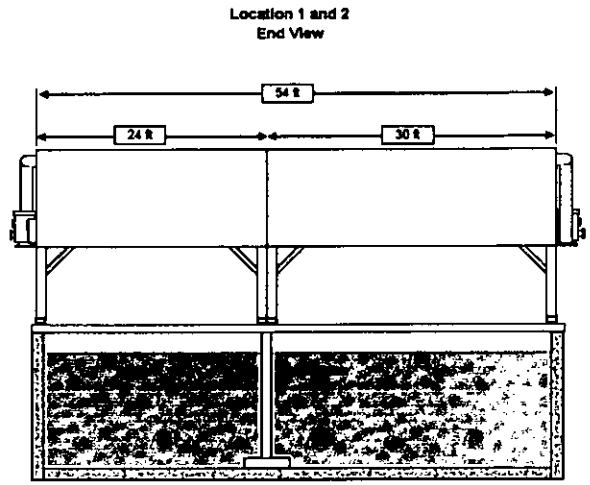
Calculated PM10 % < or = PM10 %
82.04
63.50
50.00
38.33
29.97
23.59
18.20
13.57
9.65
6.28
5.11
4.46
1.07
0.82
0.22



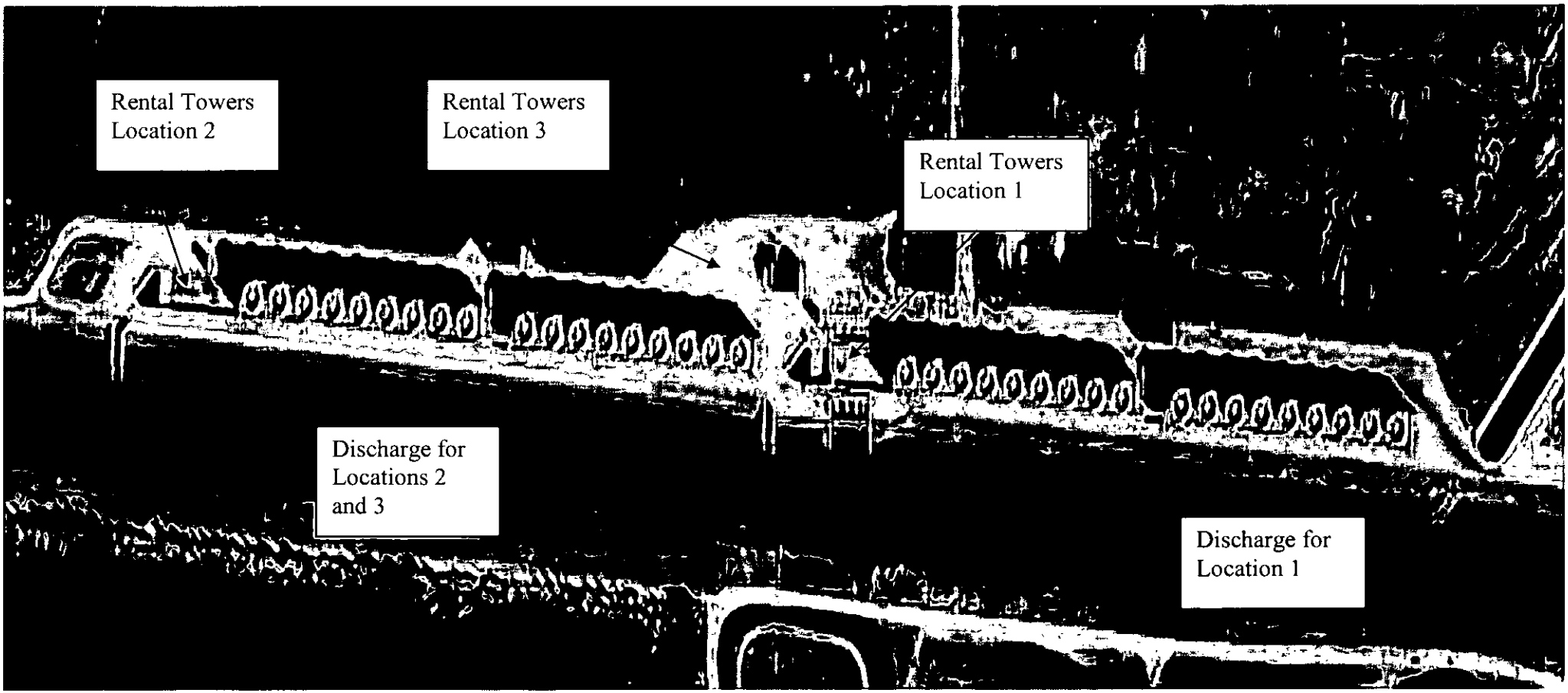


Reisman, Joel and Gordon Frisbie, *Calculating Realistic PM10 Emissions from Cooling Towers*, Abstract No. 216, Greystone Environmental Consultants, Inc.

FIGURE 2-1. RENTAL COOLING TOWER LOCATIONS



Typical Tower



3.0 AIR QUALITY REVIEW REQUIREMENTS AND APPLICABILITY

Federal and state air regulatory requirements for a new source of air pollution are discussed in Sections 3.1 to 3.4. The applicability of these regulations to the proposed modifications to the Crystal River Energy Complex is presented in Section 3.5. These regulations must be satisfied before the proposed Project can be approved.

3.1 National and State AAQS

The existing applicable national and Florida AAQS are presented in Table 3-1. Primary NAAQS were promulgated to protect the public health, and secondary NAAQS were promulgated to protect the public welfare from any known or anticipated adverse effects associated with the presence of pollutants in the ambient air. Areas of the country in violation of NAAQS are designated as nonattainment areas, and new sources to be located in or near these areas may be subject to more stringent air permitting requirements.

Florida has adopted state AAQS in Rule 62-204.240. These standards are the same as the NAAQS, except in the case of SO_2. For SO_2, Florida has adopted the former 24-hour secondary standard of 260 micrograms per cubic meter ($\mu g/m^{3)}$, and former annual average secondary standard of 60 $\mu g/m^3$.

Because PM was the only pollutant that triggered PSD review, 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 (AQRVs) in the nearest PSD Class I areas were not conducted.

3.2 Prevention of Significant Deterioration (PSD) Requirements

3.2.1 General Requirements

Under federal and State of Florida PSD review requirements, all major new or modified sources of air pollutants regulated under the Clean Air Act (CAA) must be reviewed and a pre-construction permit issued. Florida's State Implementation Plan (SIP), which contains PSD regulations, has been approved by EPA; therefore, PSD approval authority has been granted to the FDEP.

A "major facility" is defined as any one of 28 named source categories that have the potential to emit 100 tons per year (TPY) or more or any other stationary facility that has the potential to emit 250 TPY or more of any pollutant regulated under the CAA. "Potential to emit" means the capability, at maximum design capacity, to emit a pollutant after the application of control equipment. Once a new source is determined to be a "major facility" for a particular pollutant, any pollutant emitted in amounts greater than the PSD significant emission rates is subject to PSD review. For an existing source for which a modification is proposed, the modification is subject to PSD review if the net increase in emissions due to the modification is greater than the PSD significant emission rates. The PSD significant emission rates are shown in Table 3-2.

EPA has promulgated limitations to increases above an air quality baseline concentration level of SO_2, PM_{10}, and NO_2 concentrations that would constitute significant deterioration. The EPA class designations and allowable PSD increments are presented in Table 3-1. The magnitude of the allowable increment depends on the classification of the area in which a new source (or modification) will be located or have an impact. Three classifications are designated based on criteria established in the CAA. Congress promulgated areas as Class I (international parks, national wilderness areas, memorial parks larger than 5,000 acres, and national parks larger than 6,000 acres) or as Class II (all areas not designated as Class I). No Class III areas, which would be allowed greater deterioration than Class II areas, were designated. The State of Florida has adopted the EPA class designations and allowable PSD increments for SO_2, PM_{10}, and NO_2 increments.

PSD review is used to determine whether significant air quality deterioration will result from the new or modified facility. The State of Florida has adopted the PSD regulations which have been approved by EPA. (Rule 62-212.400, F.A.C.). Major new facilities and major modifications are required to undergo the following analyses related to PSD for each 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, a new facility also must be reviewed with respect to Good Engineering Practice (GEP) stack height regulations. Discussions concerning each of these requirements are presented in the following sections.

3.2.2 Control Technology Review

The control technology review requirements of the federal and state PSD regulations require that all applicable federal and state emission-limiting standards be met, and that BACT be applied to control emissions from the source. The BACT requirements are applicable to all regulated pollutants for which the increase in emissions from the facility exceeds the significant emission rate (see Table 3-2).

BACT is defined in 40 CFR 52.21 (b)(12), and Rule 62-210.200(38), F.A.C. as:

> *An emissions limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Act which would be emitted by any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of such pollutant. 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 and 61. If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular part of a source or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design, equipment, work practice, or operation and shall provide for compliance by means, which achieve equivalent results.*

BACT was promulgated within the framework of the PSD requirements in the 1977 amendments of the CAA [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 EPA's *Guidelines for Determining Best Available Control Technology (BACT)* (EPA, 1978) and in the *PSD Workshop Manual* (EPA, 1980). These guidelines were issued by EPA 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. In addition, through

implementation of these guidelines, 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."

The BACT requirements are intended to ensure that the control systems incorporated in the design of a proposed facility 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 proposed facility. BACT must, as a minimum, demonstrate compliance with new source performance standards (NSPS) for a source (if applicable). 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 emission 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 decision on BACT 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 PSD Workshop Manual was 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. However, EPA developed a concern that the bottom-up approach was not providing the level of BACT decisions originally intended. As a result, in December 1987, the EPA Assistant Administrator for Air and Radiation mandated changes in the implementation of the PSD program, including the adoption of a new "top-down" approach to BACT decision making.

The top-down BACT approach essentially starts with the most stringent (or top) technology and emissions limits that have been applied elsewhere to the same or a similar source category. The applicant must next provide a basis for rejecting this technology in favor of the next most stringent technology or propose to use it. Rejection of control alternatives may be based on technical or economic infeasibility. Such decisions are made on the basis of physical differences (e.g., fuel type), locational differences (e.g., availability of water), or significant differences that may exist in the environmental, economic, or energy impacts. The differences between the proposed facility and the facility on 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). This document has not yet been issued as final guidance or as rule. EPA has also published the document entitled *OAQPS Cost Control Manual* (EPA, 1996) to assist industry and regulators in estimating capital and annual costs of pollution control equipment.

3.2.3 Additional Impact Analysis

In addition to air quality impact analyses, federal and State of Florida PSD regulations require analyses of the impairment to visibility and the impacts on soils and vegetation that would occur as a result of the proposed source [Rule 62-212.400]. These analyses are to be conducted primarily for PSD Class I areas. Impacts as a result of general commercial, residential, industrial, and other growth associated with the source also must be addressed. These analyses are required for each pollutant emitted in significant amounts (Table 3-2).

Because PM was the only pollutant that triggered PSD review, additional analysis of impacts due to the proposed Project on soils, vegetation, visibility, growth, and air quality related values (AQRVs) in the nearest PSD Class I areas were not conducted.

3.2.4 PSD Applicability for the Project

3.2.4.1 Area Classification

The Project site is located in Citrus County, which has been designated by EPA and FDEP as an attainment or maintenance area for all criteria pollutants. Citrus County and surrounding counties are designated as PSD Class II areas for SO_2, PM(TSP), and NO_2.

3.2.4.2 Pollutant Applicability

The existing Crystal River Energy Complex is considered to be a "major existing facility" because it is one of 28 named source categories and the annual emissions of several regulated pollutants from the facility are greater than 100 TPY. Therefore, PSD review is required for any modification that results in a net increase in emissions greater than the PSD significant emission rates.

The PSD applicability for the proposed Project was presented in Section 1. As shown, the potential increase in emissions due to the proposed project exceeds the PSD significant emission rate for PM. As a result, PSD review applies for PM emissions.

3.3 Nonattainment Rules

Based on the current nonattainment provisions, all major new facilities and major modifications to existing major facilities located in a nonattainment area must undergo nonattainment review. A new major facility is required to undergo this review if the proposed pieces of equipment have the potential to emit 100 TPY or more of the nonattainment pollutant.

The Project site is located in Citrus County, which is classified as an attainment or maintenance area for all criteria pollutants. Therefore, nonattainment requirements are not applicable.

3.4 Emission Standards

3.4.1 New Source Performance Standards

The NSPS are a set of national emission standards that apply to specific categories of new sources. As stated in the CAA Amendments of 1977, these standards "shall reflect the degree of emission limitation and the percentage reduction achievable through application of the best technological system of continuous emission reduction the Administrator determines has been adequately demonstrated." The NSPS are codified in 40 CFR Part 60.

There are no applicable NSPS standards for the proposed cooling towers.

Table 3-1. National and State AAQS, Allowable PSD Increments, and Significant Impact Levels

Pollutant	Averaging Time	AAQS ($\mu g/m^3$)			PSD Increments ($\mu g/m^3$)		Significant Impact Levels ($\mu g/m^3$) [b]
		Primary Standard	Secondary Standard	Florida	Class I	Class II	
Particulate Matter[c] (PM_{10})	Annual Arithmetic Mean	50	50	50	4	17	1
	24-Hour Maximum	150	150	150	8	30	5
Sulfur Dioxide	Annual Arithmetic Mean	80	NA	60	2	20	1
	24-Hour Maximum	365	NA	260	5	91	5
	3-Hour Maximum	NA	1,300	1,300	25	512	25
Carbon Monoxide	8-Hour Maximum	10,000	10,000	10,000	NA	NA	500
	1-Hour Maximum	40,000	40,000	40,000	NA	NA	2,000
Nitrogen Dioxide	Annual Arithmetic Mean	100	100	100	2.5	25	1
Ozone[c]	8-Hour Maximum[d]	157	157	157	NA	NA	NA
Lead	Calendar Quarter Arithmetic Mean	1.5	1.5	1.5	NA	NA	NA

Note: Particulate matter (PM_{10}) = particulate matter with aerodynamic diameter less than or equal to 10 micrometers.
NA = Not applicable, i.e., no standard exists.

[a] Short-term maximum concentrations are not to be exceeded more than once per year.

[b] Maximum concentrations are not to be exceeded.

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

[d] 0.08 ppm; achieved when 3-year average of 99th percentile is 0.08 ppm or less. FDEP has not yet adopted these standards.

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

Table 3-2. PSD Significant Emission Rates and *De Minimis* Monitoring Concentrations

Pollutant	Regulated Under	Significant Emission Rate (TPY)	*De Minimis* Monitoring Concentration[a] ($\mu g/m^3$)
Sulfur Dioxide	NAAQS, NSPS	40	13, 24-hour
Particulate Matter [PM(TSP)]	NSPS	25	10, 24-hour
Particulate Matter (PM_{10})	NAAQS	15	10, 24-hour
Nitrogen Dioxide	NAAQS, NSPS	40	14, annual
Carbon Monoxide	NAAQS, NSPS	100	575, 8-hour
Volatile Organic Compounds (Ozone)	NAAQS, NSPS	40	100 TPY[b]
Lead	NAAQS	0.6	0.1, 3-month
Sulfuric Acid Mist	NSPS	7	NM
Total Fluorides	NSPS	3	0.25, 24-hour
Total Reduced Sulfur	NSPS	10	10, 1-hour
Reduced Sulfur Compounds	NSPS	10	10, 1-hour
Hydrogen Sulfide	NSPS	10	0.2, 1-hour
Mercury	NESHAP	0.1	0.25, 24-hour

Note: Ambient monitoring requirements for any pollutant may be exempted if the impact of the increase in emissions is below *de minimis* monitoring concentrations.

NAAQS = National Ambient Air Quality Standards.
NM = No ambient measurement method established; therefore, no *de minimis* concentration has been established.
NSPS = New Source Performance Standards.
NESHAP = National Emission Standards for Hazardous Air Pollutants.
g/m^3 = micrograms per cubic meter.

[a] Short-term concentrations are not to be exceeded.
[b] No *de minimis* concentration; an increase in VOC emissions of 100 TPY or more will require monitoring analysis for ozone.
[c] Any emission rate of these pollutants.

Sources: 40 CFR 52.21.
Rule 62-212.400

4.0 AMBIENT MONITORING ANALYSIS

4.1 Monitoring Requirements

In accordance with requirements of 40 CFR 52.21(m) and Rule 62-212.400(5)(f), F.A.C., any application for a PSD permit must contain an analysis of continuous ambient air quality data in the area affected by the proposed major stationary facility or major modification. For a new major facility, the affected pollutants are those that the facility would potentially emit in significant amounts. For a major modification, the pollutants are those for which the net emissions increase exceed the significant emission rates (see Table 3-2).

Ambient air monitoring for a period of up to one year is generally appropriate to satisfy the PSD monitoring requirements. A minimum of 4 months of data is required. Existing data from the vicinity of the proposed source may be used if the data meet certain quality assurance requirements; otherwise, additional data may need to be gathered. Guidance in designing a PSD monitoring network is provided in EPA's *Ambient Monitoring Guidelines for Prevention of Significant Deterioration* (1987).

An exemption from the preconstruction ambient monitoring requirements is also available if certain criteria are met. If the predicted increase in ambient concentrations, due to the proposed modification, is less than specified *de minimis* concentrations, then the modification can be exempted from the pre-construction air monitoring requirements for that pollutant per FDEP rule. The proposed Project will result in PSD review for only PM emissions and as such, no preconstruction ambient monitoring is required.

There is no PSD *de minimis* monitoring concentration established for VOC. However, an increase in VOC emissions of 100 TPY or more requires a preconstruction ambient monitoring analysis for ozone (O_3). The proposed Project will not result in VOC emissions and therefore no preconstruction ambient monitoring analysis is required.

5.0 BEST AVAILABLE CONTROL TECHNOLOGY ANALYSIS

5.1 Requirements and BACT Summary

The 1977 CAA Amendments established requirements for the approval of pre-construction permit applications under the PSD program. As discussed in Section 3.2.2, one of these requirements is that BACT be installed for those pollutants requiring PSD review. BACT determinations must be made on a case-by-case basis considering technical, economic, energy, and environmental impacts for various BACT alternatives. To bring consistency to the BACT process, the EPA developed the "top-down" approach to BACT determination that is followed by FDEP.

The first step in a top-down BACT analysis is to determine, for each applicable pollutant, the most stringent control alternative available for a similar source or source category. If it can be shown that this level of control is not feasible on the basis of technical, economic, energy, or environmental impacts for the source in question, then the next most stringent level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy, or environmental consideration.

In the case of the proposed Project, PM emissions require BACT analysis. The following table summarizes the proposed BACT limits. The BACT analysis is presented in the following sections.

Pollutant	Proposed Cooling Tower BACT (% Drift)
PM	0.0015 (w/Mist Eliminators) and 32.4E9 gallons per year of circulation water.

5.2 Cooling Tower BACT Analysis

5.2.1 Particulate Matter (PM)

5.2.1.1 Previous BACT Determinations

As part of the BACT analysis, a review was performed of previous PM BACT determinations for cooling towers listed in the RACT/BACT/LAER Clearinghouse on EPA's web page. A summary of BACT determinations from this review are presented in Table 5-1. Determinations issued during the last 3 years are shown in the table.

Table 5-1. RACT/BACT/LAER Clearinghouse, Cooling Towers Permitted from 2003 to 2006.

Facility	Recirculation Water Flow Rate	Pollution Control Technology	State	Basis	Date
Diamond Wanapa I, L. P.	0.0005	Drift Eliminators	OR	BACT-PSD	8/8/2005
Auburn Nugget	0.005	Drift Eliminators	IN	BACT-PSD	5/31/2005
Newmont Nevada Energy Investment, LLC	0.0005	Drift Eliminators	NV	BACT-PSD	5/5/2005
Tigen-Nassua Energy Corp.	0.0005	Drift Eliminators	NY	BACT-PSD	3/31/2005
Mirant Mid-Atlantic, LLC	0.001	Drift Eliminators	MD	BACT-PSD	11/5/2004
Midamerican Energy Company	0.001	Drift Eliminators	IA	BACT-PSD	6/17/2003
Wallula Generation, LLC	0.0005	Drift Eliminators	WA	LAER	1/3/2003

From the review of previous BACT determinations, it is evident that PM BACT determinations for mechanical cooling towers have exclusively been based on drift elimination.

5.2.1.2 Control Technology Feasibility

As stated previously drift eliminators are the control technology utilized for cooling towers. Drift eliminators are usually incorporated into the tower design to remove as many droplets as practical from the air stream before exiting the tower. The drift eliminators used in cooling towers rely on the inertial separation caused by directional changes in the airflow while passing through the eliminators.

Types of drift eliminator configurations include herringbone (blade type), wave form, and cellular (or honeycomb) designs. The cellular units generally are the most efficient. Drift eliminators may include various materials, such as ceramics, fiber reinforced cement, fiberglass, metal, plastic, and wood installed or formed closely spaced slats, sheets, honeycomb assemblies, or tiles. The materials may include other features, such as corrugations and water removal channels, to enhance the drift removal further.

5.2.1.3 PM BACT Selection

PEF proposes drift eliminators with a BACT level of 0.0015 % drift rate with a total circulation water use limit of 32.4E9 gallons per year, based on 3,000 hours per year at a maximum circulation rate of 180,000 gallons per minute (gpm). This level of control is the best available in the industry for cooling towers that are modular in design. In addition, this level of control and limited operation, results in nearly equivalent annual PM emissions to the same cooling tower with a BACT level of 0.0005 % drift rate and unrestricted operation. The annual PM emissions based on 0.0015% and 32.4E9 gallons per year are equal to 52.7 tons compared to 51.3 tons with a drift rate of 0.0005% and 8,760 hours per year of operation. It should also be noted that the cooling tower triggers PSD review for only PM. PM_{10} emissions are estimated to be 3.2 TPY with the proposed BACT limits. It is proposed that this level of control is reasonable based on previous BACT determinations for similar sources.

APPENDIX A

PM_{10} EMISSION CALCULATION

Calculating Realistic PM_{10} Emissions from Cooling Towers

Abstract No. 216 **Session No. AM-1b**

Joel Reisman and Gordon Frisbie
Greystone Environmental Consultants, Inc., 650 University Avenue, Suite 100, Sacramento, California 95825

ABSTRACT

Particulate matter less than 10 micrometers in diameter (PM_{10}) emissions from wet cooling towers may be calculated using the methodology presented in EPA's AP-42[1], 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_{10}. However, for wet cooling towers with medium to high TDS levels, this method is overly conservative, and predicts significantly higher PM_{10} 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_{10} modeled concentrations and/or the need to purchase expensive Emission Reduction Credits (ERCs) in PM_{10} non-attainment areas. Since these towers have fairly low emission points (10 to 15 m above ground), over-predicting PM_{10} emission rates can easily result in exceeding federal Prevention of Significant Deterioration (PSD) significance levels at a project's fenceline. This paper presents a method for computing realistic PM_{10} 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[1] 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_{10} 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_{10} 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:

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

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_{10}, a regulated criteria pollutant. However, as the following analysis demonstrates, only a very small fraction is actually PM_{10}.

COMPUTING THE PM_{10} 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_{10} 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[2], 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_{10} in the total cooling tower PM emissions.

In calculating PM_{10} 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 (ρ_w) of water; 1.0 g/cm^3 or $1.0*10^{-6}$ $\mu g/\mu m^3$.
- The solid particles were assumed to have the same density (ρ_{TDS}) as sodium chloride, (i.e., 2.2 g/cm^3).

Using the formula for the volume of a sphere, $V = 4\pi r^3/3$, and the density of pure water, $\rho_w = 1.0$ 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 :

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

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

substituting,

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

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:

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

Solving for D_p:

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

Where,

TDS is in units of ppmw
D_p = diameter of solid particle, micrometers (μm)
D_d = diameter of drift droplet, μm

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 μm in diameter, we conclude that approximately 14.9 percent of the mass emissions are equal to or smaller than PM_{10}. The balance of the solid

particulate are particulate greater than 10 μm. Hence, 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 PM_{10} emissions are actually lower, because more of the solid particles are larger than 10 μm.

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

EPRI Droplet Diameter (μm)	Droplet Volume (μm^3) [2][1]	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm^3)	Solid Particle Diameter (μm) [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

[1] Bracketed numbers refer to equation number in text.

The percentage of PM_{10}/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 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 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[1] 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 PM_{10} once the water has evaporated. Particles larger than 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_{10} 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^3) [2]'	Droplet Mass (μg) [3]	Particle Mass (Solids) (μg) [4]	Solid Particle Volume (μm^3)	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	1.616
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	49.612
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 PM10

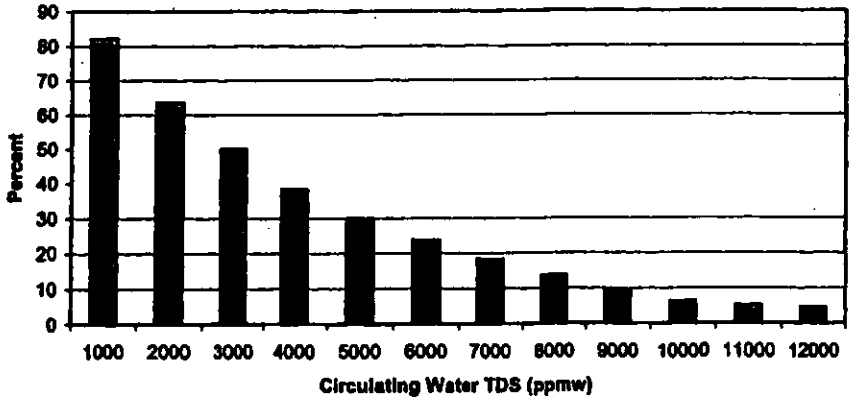
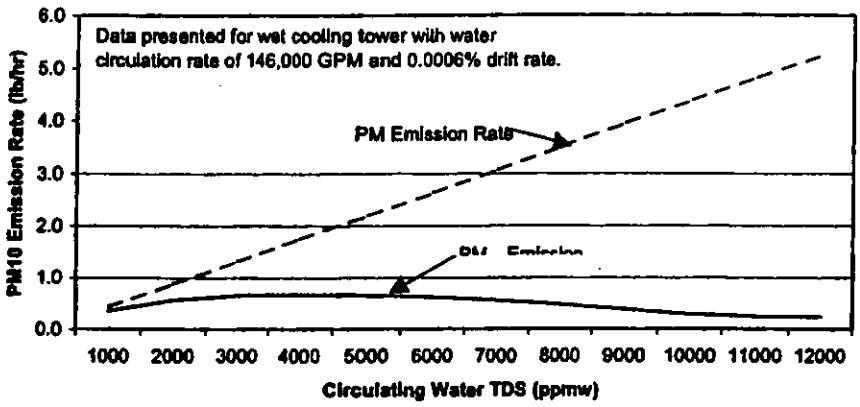


Figure 2: PM_{10} Emission Rate vs. TDS



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/chief/ap42/, United States Environmental Protection Agency, Office of Air Quality Planning and Standards, January.

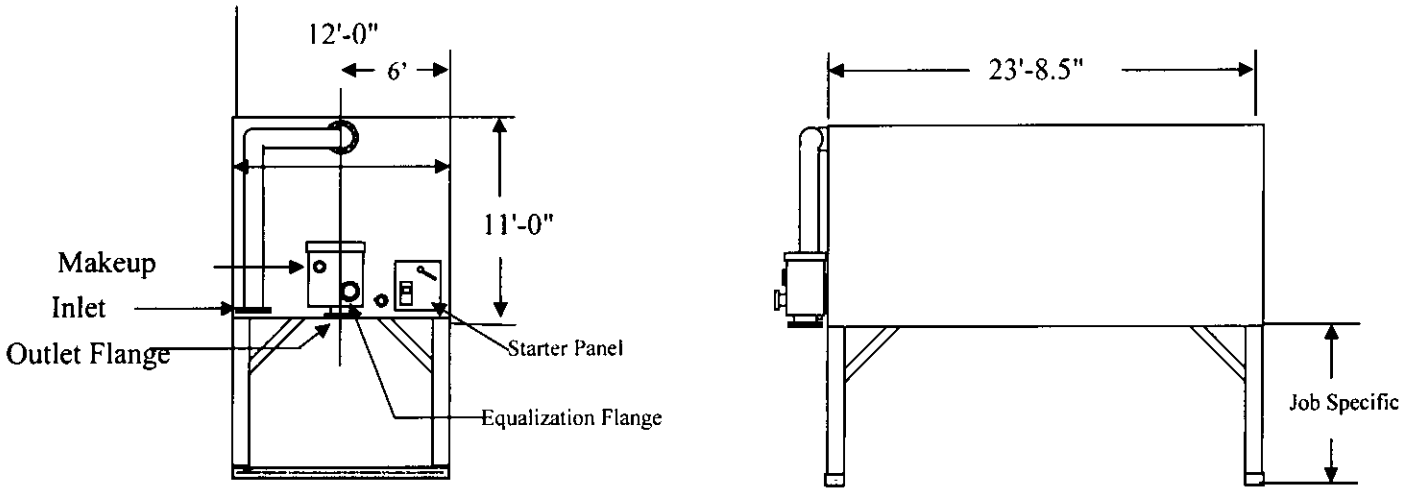
2. Aull, 1999. Memorandum from R. Aull, Brentwood Industries to J. Reisman, Greystone, December 7, 1999.

KEY WORDS

Drift
Drift eliminators
Cooling tower
PM_{10} emissions
TDS

APPENDIX B
COOLING TOWER VENDOR DATA

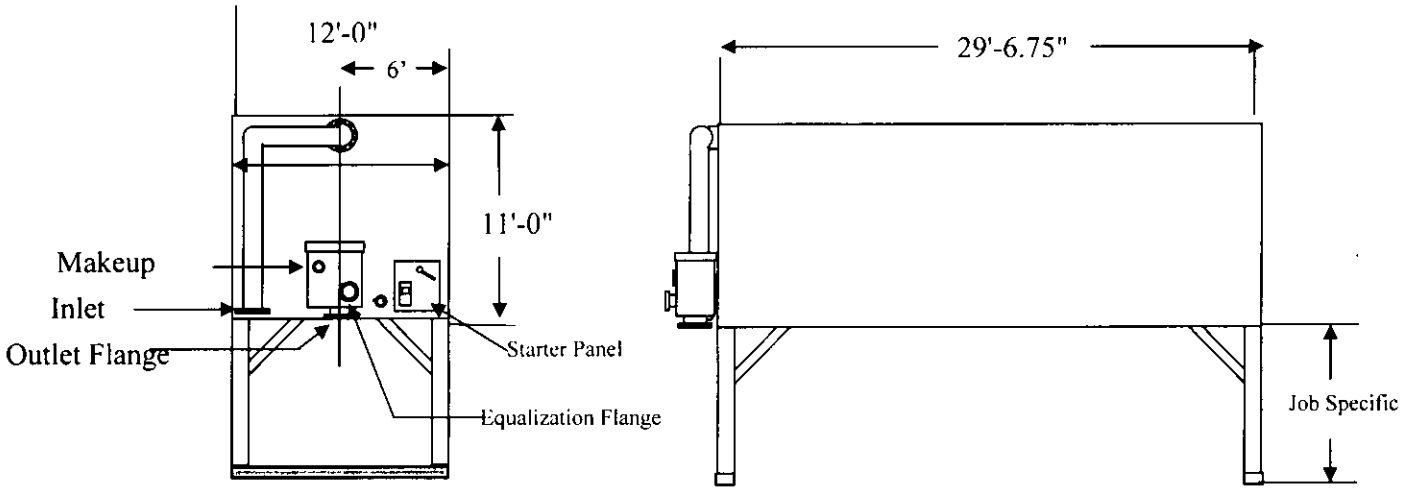
R-288 Modular Cooling Tower Specifications



General	
Type	*Counterflow*
Draft	*Forced Draft*
Framework Members	*FRP*
Fill and Drift Eliminators	*PVC*
Hardware	*304 Stainless Steel*
Water Distribution Type	*Enclosed Low Pressure*
Nozzles	*Low Pressure, Anti Fouling*
Water Specifications	
Maximum Circulating Water Flow Rate	*2,880 Gallons Per Minute.*
Maximum Water Temperature	*140℉*
Drift Loss, % of circulating water flow	*.0015%*
Tower Pump Head	*13 feet*
Physical Specifications	
Weight Shipping	*15,000 lbs*
Weight Operating	*25,000 lbs*
Nominal Cell Dimensions	*12' x 24'*
Tower Height	*11'*
Substructure	*Job Specific*
Piping Specifications	
Inlet	*12" PVC Flange*
Outlet	*12" Molded Plastic Flange*
Makeup Connection	*2" Female NPT*
Equalization	*6" PVC Flange*
Driver Specifications	
Speed Reducer	*NA (Fans are Direct Drive)*
Number of Fan Motors	*8*
Rated Horse Power each	*7.5*
Total Fan Horse Power	*60*
Full Load Amps Each	*12.5*
Full Load Amps Total	*100*
Kind	*Electric*
Type	*TEAO*
Full Load Speed (RPM)	*870*
Electrical (phase/cycles/volts)	*3/60/480*

aggreko CoolingTower SERVICES

R-360 Modular Cooling Tower Specifications



General	
Type	*Counterflow*
Draft	*Forced Draft*
Framework Members	*FRP*
Fill and Drift Eliminators	*PVC*
Hardware	*304 Stainless Steel*
Water Distribution Type	*Enclosed Low Pressure*
Nozzles	*Low Pressure, Anti Fouling*
Water Specifications	
Maximum Circulating Water Flow Rate	*3,600 Gallons Per Minute.*
Maximum Water Temperature	*140°F*
Drift Loss, % of circulating water flow	*.0015%*
Tower Pump Head	*13 feet*
Physical Specifications	
Weight Shipping	*18,000 lbs*
Weight Operating	*25,000 lbs*
Nominal Cell Dimensions	*12' x 30'*
Tower Height	*11'*
Substructure	*Job Specific*
Piping Specifications	
Inlet	*12" PVC Flange*
Outlet	*12" Molded Plastic Flange*
Makeup Connection	*2" Female NPT*
Equalization	*6" PVC Flange*
Driver Specifications	
Speed Reducer	*NA (Fans are Direct Drive)*
Number of Fan Motors	*10*
Rated Horse Power each	*7.5*
Total Fan Horse Power	*75*
Full Load Amps Each	*12.5*
Full Load Amps Total	*125*
Kind	*Electric*
Type	*TEAO*
Full Load Speed (RPM)	*870*
Electrical (phase/cycles/volts)	*3/60/480*

aggreko CoolingTower SERVICES

Cooling Towers Certified by CTI Under STD-201

As stated in its opening paragraph, CTI Standard 201... "sets forth a program whereby the Cooling Technology Institute will certify that all models of a line of water cooling towers offered for sale by a specific Manufacturer will perform thermally in accordance with the Manufacturer's published ratings..." By the purchase of a "certified" model, the User has assurance that the tower will perform as specified, provided that its circulating water is no more than acceptably contammated-and that its air supply is ample and unobstructed. Either that model, or one of its close design family members, will have been thoroughly tested by the single CTI-licensed testing agency for Certification and found to perform as claimed by the Manufacturer.

CTI Certification under STD-201 is limited to thermal operating conditions with entering wet bulb temperatures between 12.8°C and 32.2°C (55°F to 90°F), a maximum process fluid temperature of 51.7°C (125°F), a cooling range of 2.2°C (4°F) or greater, and a cooling approach of 2.8°C (5°F) or greater. The manufacturer may set more restrictive limits if desired or publish less restrictive limits if the CTI limits are clearly defined and noted in the publication.

Following is a list of cooling tower models currently certified under STD-201. They are part of product lines offered by Baltimore Aircoil Company, Inc.; Delta Cooling Towers, Inc.; Evapco, Inc.; Fabrica Mexicana De Torres, S.A.; GEA Polacel; Imeco, div of York International; Ltd; Kyung In Machinery Company, Ltd.; Liang Chi Industry Company, Ltd.; Mesan Cooling Tower, Ltd; Ryowo (Holding) Company, Ltd; SPX Cooling Technologies; Tower Tech, Inc; The Trane Company and Zhejiang Jinling Refrigeration Engineering Company who are committed to the manufacture and installation of full-performance towers. In competition with each other, these manufacturers benefit from knowing that they each achieve their published performance capability. They are, therefore, free to distinguish themselves through design excellence and concern for the User's operational safety and convenience.

Those Manufacturers who have not yet chosen to certify their product lines are invited to do so at the earliest opportunity. Contact Virginia A. Manser, Cooling Technology Institute, PO Box 73383, Houston, TX 77273 for further information.

Baltimore Aircoil Company, Inc.
FXT Line of CTI Certified Cooling Towers
CTI Certification Validation Number 92-11-01

FXT-6	FXT-26-CM	FXT-58-EM	FXT-160-HM
FXT-7.5	FXT-26	FXT-58-FM	FXT-160
FXT-7.5-CM	FXT-30	FXT-58	FXT-175
	FXT-33	FXT-68	FXT-200
FXT-11			
FXT-11-CM	FXT-38	FXT-74-FM	FXT-216-JM
FXT-11-DM	FXT-42	FXT-74	FXT-216
	FXT-47	FXT-87	FXT-250
FXT-16	FXT-47-HM	FXT-99	FXT-268
FXT-16-CM			
FXT-20		FXT-115-GM	
FXT-20-EM		FXT-115	
		FXT-130	
		FXT-142	

1. Multiple cell models of the single cell models above are also available but not listed.
2. Towers which include the suffix "X" added to the models above (e.g. FXT-11X) are not CTI Certified, due either to application, product accessories or modifications.

Baltimore Aircoil Company, Inc.
FXV Closed Circuit Cooling Tower Line of
CTI Certified Cooling Towers
CTI Certification Validation Number 98-11-09

Models with One Air Inlet Side and One Coil

FXV-L421GM	FXV-L432HM	FXV-L443JM	FXV-L641KM	FXV-LQ640KM	FXV-L663KM
FXV-L421	FXV-L432	FXV-L443	FXV-L641	FXV-LQ640	FXV-L663
FXV-421	FXV-432	FXV-443	FXV-641MM	FXV-Q640MM	FXV-663MM
FXV-421KM	FXV-4321M	FXV-443MM	FXV-641	FXV-Q640	FXV-663
			FXV-641OM	FXV-Q640OM	FXV-663OM
FXV-L422GM	FXV-L433HM	FXV-L444JM			
FXV-L422	FXV-L433	FXV-L444KM	FXV-L642KM	FXV-LQ641KM	FXV-L664KM
FXV-422	FXV-433	FXV-L444	FXV-L642	FXV-LQ641LM	FXV-L664LM
FXV-422KM	FXV-433-LM	FXV-444	FXV-642MM	FXV-LQ641	FXV-L664
			FXV-642	FXV-Q641-NM	FXV-664NM
FXV-L423GM	FXV-L434HM	FXV-LQ440JM	FXV-642OM	FXV-Q641	FXV-664
FXV-L423	FXV-L434JM	FXV-LQ440			
FXV-423	FXV-L434	FXV-Q440	FXV-L643KM	FXV-L661KM	FXV-LQ660KM
FXV-423KM	FXV-434	FXV-Q440MM	FXV-L643	FXV-L661	FXV-LQ660
			FXV-643MM	FXV-661MM	FXV-Q660MM
FXV-L424GM	FXV-L441JM	FXV-LQ441JM	FXV-643	FXV-661	FXV-Q660
FXV-L424HM	FXV-L441	FXV-LQ441KM	FXV-643OM	FXV-661OM	FXV-Q660OM
FXV-L424	FXV-441	FXV-LQ441			
FXV-424	FXV-441MM	FXV-Q441	FXV-L644KM	FXV-L662KM	FXV-LQ661KM
			FXV-L644LM	FXV-L662	FXV-LQ661LM
FXV-L431HM	FXV-L442JM		FXV-L644	FXV-662MM	FXV-LQ661
FXV-L431	FXV-L442		FXV-644NM	FXV-662	FXV-Q661NM
FXV-431	FXV-442		FXV-644	FXV-662OM	FXV-Q661
FXV-431LM	FXV-442MM				

Models with Two Air Inlet Sides and Two Coils

FXV-288-31M	FXV-288-41M	FXV-288-1QM	FXV-364-31N	FXV-364-41N	FXV-364-1QN
FXV-288-31N	FXV-288-41N	FXV-288-1QN	FXV-364-31O	FXV-364-41O	FXV-364-1QO
FXV-288-31O	FXV-288-41O	FXV-288-1QO	FXV-364-31P	FXV-364-41P	FXV-364-1QP
FXV-288-31P	FXV-288-41P	FXV-288-1QP	FXV-364-31Q	FXV-364-41Q	FXV-364-1QQ
FXV-288-31Q	FXV-288-41Q	FXV-288-1QQ	FXV-364-31R	FXV-364-41R	FXV-364-1QR
FXV-288-31R	FXV-288-41R	FXV-288-1QR	FXV-364-31S	FXV-364-41S	FXV-364-1QS

FXV Closed Circuit Cooling Towers
Optional Accessories and Constructions – Certification Status

Construction Options	Suffix	CTICertified (Note 1)	Capacity Adjustment Required
Cleanable Tube Coil	A	Yes	Note 2
Heavy Duty Coil	S	Yes	Note 2
Low Sound Fan	Q	Yes	Note 3
Internal Access Package	none	Yes	Note 4
Not CTI Certified	X	No	Note 5

Note:

1. Typically no suffix is used for an accessory or modification that does not affect capacity.
2. Construction does not affect thermal capacity, but does increase Process Fluid Pressure Drop as noted in BAC Selection Software.
3. Low Sound fans on models with Two Air Inlet Side and Two coils incur a capacity reduction of 2% relative to the same model with a standard fan.
4. Internal Access Package on the models with One Air Inlet Side and One Coil incur a capacity reduction of 1.8%, depending on the model and operating conditions. Refer to BAC Selection Software to determine the effect on a specific model at a specific operating condition.
5. This suffix is affixed to model numbers of units that are not CTI Certified, due either to application or product accessories or modifications to the tower.
6. The CTI thermal performance certification applies only to units with water as the process fluid

SPX Cooling Technologies
Product Branding: Marley
MHF Series of CTI Certified Closed-Circuit Fluid Coolers
CTI Certification Validation Number 04-14-07

MHF702B061	MHF703C061	MHF704D061	MHF705F061	MHF706E061	MHF707H061
MHF702B062	MHF703C062	MHF704D062	MHF705F062	MHF706E062	MHF707H062
MHF702B081	MHF703C081	MHF704D081	MHF705F081	MHF706E081	MHF707H081
MHF702B082	MHF703C082	MHF704D082	MHF705F082	MHF706E082	MHF707H082
MHF702B101	MHF703C084	MHF704D084	MHF705F084	MHF706E084	MHF707H084
MHF702B102	MHF703C101	MHF704D101	MHF705F101	MHF706E101	MHF707H101
MHF702B121	MHF703C102	MHF704D102	MHF705F102	MHF706E102	MHF707H102
MHF702B122	MHF703C121	MHF704D121	MHF705F121	MHF706E121	MHF707H121
	MHF703C122	MHF704D122	MHF705F122	MHF706E122	MHF707H122
MHF702C061	MHF703C124	MHF704D124	MHF705F124	MHF706E124	MHF707H124
MHF702C062					
MHF702C081	MHF703D061	MHF704E061	MHF705H061	MHF706H061	MHF707J061
MHF702C082	MHF703D062	MHF704E062	MHF705H062	MHF706H062	MHF707J062
MHF702C101	MHF703D081	MHF704E081	MHF705H081	MHF706H081	MHF707J081
MHF702C102	MHF703D082	MHF704E082	MHF705H082	MHF706H082	MHF707J082
MHF702C121	MHF703D084	MHF704E084	MHF705H084	MHF706H084	MHF707J084
MHF702C122	MHF703D101	MHF704E101	MHF705H101	MHF706H101	MHF707J101
	MHF703D102	MHF704E102	MHF705H102	MHF706H102	MHF707J102
MHF702D061	MHF703D121	MHF704E121	MHF705H121	MHF706H121	MHF707J121
MHF702D062	MHF703D122	MHF704E122	MHF705H122	MHF706H122	MHF707J122
MHF702D081	MHF703D124	MHF704E124	MHF705H124	MHF706H124	MHF707J124
MHF702D082					
MHF702D101	MHF703E061	MHF704G061	MHF705J061	MHF706J061	MHF707L061
MHF702D102	MHF703E062	MHF704G062	MHF705J062	MHF706J062	MHF707L062
MHF702D121	MHF703E081	MHF704G081	MHF705J081	MHF706J081	MHF707L081
MHF702D122	MHF703E082	MHF704G082	MHF705J082	MHF706J082	MHF707L082
	MHF703E084	MHF704G084	MHF705J084	MHF706J084	MHF707L084
	MHF703E101	MHF704G101	MHF705J101	MHF706J101	MHF707L101
	MHF703E102	MHF704G102	MHF705J102	MHF706J102	MHF707L102
	MHF703E121	MFH704G121	MHF705J121	MHF706J121	MHF707L121
	MHF703E122	MFH704G122	MHF705J122	MHF706J122	MHF707L122
	MHF703E124	MFH704G124	MHF705J124	MHF706J124	MHF707L124
		MFH704H061	MHF705K061	MHF706L061	MHF707M061
		MFH704H062	MHF705K062	MHF706L062	MHF707M062
		MHF704H081	MHF705K081	MHF706L081	MHF707M081
		MHF704H082	MHF705K082	MHF706L082	MHF707M082
		MHF704H084	MHF705K084	MHF706L084	MHF707M084
		MHF704H101	MHF705K101	MHF706L101	MHF707M101
		MHF704H102	MHF705K102	MHF706L102	MHF707M102
		MHF704H121	MHF705K121	MHF706L121	MHF707M121
		MFH704H122	MHF705K122	MHF706L122	MHF707M122
		MFH704H124	MHF705K124	MHF706L124	MHF707M124
				MHF706M061	MHF707N061
				MHF706M062	MHF707N062
				MHF706M081	MHF707N081
				MHF706M082	MHF707N082
				MHF706M084	MHF707N084
				MHF706M101	MHF707N101
				MHF706M102	MHF707N102
				MHF706M121	MHF707N121
				MHF706M122	MHF707N122
				MHF706M124	MHF707N124
				MHF706N061	
				MHF706N062	
				MHF706N081	
				MHF706N082	
				MHF706N084	
				MHF706N101	
				MHF706N102	
				MHF706N121	
				MHF706N122	
				MHF706N124	

SPX Cooling Technologies
Product Branding: Marley
Quadraflow Series Line of CTI Certified Cooling Towers
CTI Certification Validation Number 92-14-02

21121	22121	23121	24121
21122	22122	23122	24122
21123	22123	23123	24123
21124		23124	24124
	22221		24125
21221	22222	23221	24126
21222	22223	23222	24127
	22224	23223	
21321	22225	23224	24221
21322		23225	24222
21323			24223
			24224
			24225

SPX Cooling Technologies
Product Branding: Marley
AV Series Line of CTI Certified Cooling Towers
CTI Certification Validation Number 98-14-04

AV61001	AV63001	AV65001	AV67001
AV61011	AV63011	AV65011	AV67011
AV61021	AV63021	AV65021	AV67021
AV61031	AV63031	AV65031	AV67031
AV61041	AV63041	AV65041	AV67041
		AV65051	
AV62001	AV64001		
AV62011	AV64011	AV66001	
AV62021	AV64021	AV66011	
AV62031	AV64031	AV66021	
AV62041	AV64041	AV66031	
AV62051	AV64051	AV66041	

Multiple cell models of the single cell models above are also available but not listed.

Tower Tech, Inc
TTXE Line of CTI Certified Cooling Towers
CTI Certification Validation Number 04-17-04

3.0 hp/fan Models	5.0 hp/fan Models	7.5 hp/fan Models
TTXE-021930	TTXE-021950	TTXE-021975
TTXE-031930	TTXE-031950	TTXE-031975
TTXE-041930	TTXE-041950	TTXE-041975
TTXE-061930	TTXE-061950	TTXE-061975
TTXE-081930	TTXE-081950	TTXE-081975
TTXE-101930	TTXE-101950	TTXE-101975

Models listed above are for single cells with a base inlet height of 6-ft.

Multiple cell models of the single cell models above are also available but not listed.

Models with inlet heights more or less than 6-ft are also available but not listed.

Multiple cell models of the single cell models and/or models with air inlet heights more or less than 6-ft require capacity correction per the TTGE correction table submitted with the CTI Certification application.

The Trane Company
Series Quiet Line of CTI Certified Cooling Towers
CTI Certification Validation Number 92-14-01
Standard Models

TQ8301C	TQ 8303E	TQ 8305D	TQ 8307E	TQ 8310C	TQ 8312C
TQ8301D	TQ 8303F	TQ 8305E	TQ 8307F	TQ 8310D	TQ 8312D
TQ 8301E	TQ 8303G	TQ 8305F	TQ 8307G	TQ 8310E	TQ 8312E
TQ 8301F	TQ 8303H	TQ 8305G	TQ 8307H	TQ 8310F	TQ 8312F
		TQ 8305H	TQ 8307J	TQ 8310G	TQ 8312G
		TQ 8305J	TQ 8307K	TQ 8310H	TQ 8312H
		TQ 8305K	TQ 8307M	TQ 8310J	TQ 8312J
				TQ 8310K	TQ 8312K
					TQ 8312N
					TQ 8312R
TQ 8302D	TQ 8304D	TQ 8306D	TQ 8309C	TQ 8311C	
TQ 8302E	TQ 8304E	TQ 8306E	TQ 8309D	TQ 8311D	
TQ 8302F	TQ 8304F	TQ 8306F	TQ 8309E	TQ 8311E	
TQ 8302G	TQ 8304G	TQ 8306G	TQ 8309F	TQ 8311F	
	TQ 8304H	TQ 8306H	TQ 8309G	TQ 8311G	
		TQ 8306J	TQ 8309H	TQ 8311H	
		TQ 8306K	TQ 8309J	TQ 8311J	
			TQ 8309K	TQ 8311K	
				TQ 8311N	

Multiple cell models of the single cell models above are also available but not listed.

Low Noise Models

TQ 8301AL	TQ 8303AL	TQ 8305AL	TQ 8307AL	TQ 8310AL	TQ 8312AL
TQ 8301BL	TQ 8303BL	TQ 8305BL	TQ 8307BL	TQ 8310BL	TQ 8312BL
TQ 8301CL	TQ 8303CL	TQ 8305CL	TQ 8307CL	TQ 8310CL	TQ 8312CL
TQ 8301DL	TQ 8303DL	TQ 8305DL	TQ 8307DL	TQ 8310DL	TQ 8312DL
TQ 8301EL	TQ 8303EL	TQ 8305EL	TQ 8307EL	TQ 8310EL	TQ 8312EL
	TQ 8303FL	TQ 8305FL	TQ 8307FL	TQ 8310FL	TQ 8312FL
		TQ 8305GL	TQ 8307GL	TQ 8310GL	TQ 8312GL
		TQ 8305HL	TQ 8307HL	TQ 8310HL	TQ 8312HL
		TQ 8305JL	TQ 8307JL	TQ 8310JL	TQ 8312JL
		TQ 8305KL		TQ 8310KL	TQ 8312KL

Attachment D

Palm Beach County Health Department
TITLE V MONTHLY PROGRESS REPORT
December 2005

1. **Permitting:** Review and Evaluation of Air Permit Applications by Facilities Subject to Title V Requirements

Number of New Permit Applications Received and Logged for Processing by Program	0
Number of Pending Permit Applications Under Review	5
Number of Permits Issued by Program	1
Number of Permit Requests Denied by Program	0

2. **Compliance Assistance, Verification and Enforcement:**

Number of Full Compliance Evaluations	2
Number of Facility Inspections (Non Full Compliance Evaluations)	14
Number of Test Reports Reviewed	8
Number of Stack Tests (Other Than RATA) Witnessed	0
Number of RATA Tests Witnessed	0
Number of Excess Emissions Reports Reviewed	0
Number of Title V Annual Operating Reports Received	2
Number of Title V Annual Operating Reports Reviewed	0
Number of Complaint Investigations	0
Number of Enforcement Actions Initiated*	1
Number of Enforcement Actions Completed	0
Number of Title V General Permit Facility Inspections	18
Number of Title V General Permit Facility Statements of Compliance Received	18
Number of Title V General Permit Facility Statements of Compliance Reviewed	18
Number of Synthetic Minor Facility Inspections	0
Number of Title V Statements of Compliance Received	0
Number of Title V Statements of Compliance Reviewed	0

* Actions begun by Program

3. **Training / Meeting Activities:**

Number of Training / Meeting Activities	4
Number of Staff Attending	5

Please attach any details, as required.

Note: Where possible, ARMS data will be utilized to verify the above data.