

TECHNICAL EVALUATION
AND
PRELIMINARY DETERMINATION

Gulf Power Company – Crist Unit 7

New Cooling Tower

Escambia County

0330045-014-AC



Department of Environmental Protection
Division of Air Resources Management
Bureau of Air Regulation
North Permitting Section

July 13, 2006

TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION

1. GENERAL INFORMATION

1.1 APPLICANT NAME AND ADDRESS

Gulf Power Company
One Energy Place
Pensacola, Florida 32520
Authorized Representative: Penny Manuel, Responsible Official

1.2 REVIEWING AND PROCESS SCHEDULE

June 8, 2006 Received Permit Application
June 14, 2006 Application complete

2. FACILITY INFORMATION

2.1 FACILITY LOCATION

The facility is located on Pate Road Rd., off of 10 Mile Road, Escambia County, Florida.

2.2 STANDARD INDUSTRIAL CLASSIFICATION CODES (SIC)

Industry Group No.	49	Electric, Gas and Sanitary Services
Industry No.	4911	Electric Services

2.3 FACILITY CATEGORY

This facility consists of four fossil fuel fired steam generators (boilers) and two fly ash silos. Boilers 4 and 5 are substitution Acid Rain Phase I Units. Boilers 6 and 7 are Acid Rain Phase I Units. All four boilers are subject to the Acid Rain Phase II requirements. Pulverized coal is the primary fuel for boilers 4, 5, 6 and 7. Fuel oil is used as supplemental fuel in all four of the boilers.

This facility is classified as a Major or Title V Source of air pollution because emissions of at least one regulated air pollutant, such as particulate matter (PM/PM₁₀), sulfur dioxide (SO₂), nitrogen oxides (NO_x), carbon monoxide (CO), or volatile organic compounds (VOC) exceeds 100 tons per year (TPY).

This facility is within an industry included in the list of the 28 Major Facility Categories as defined for Major Stationary Sources in Rule 62-210.200, F.A.C. Because emissions are greater than 100 TPY for at least one criteria pollutant, the facility is also a Major Facility with respect to Rule 62-212.400, Prevention of Significant Deterioration (PSD). Based upon the air construction permit application, the facility is a Title V source, a major source of hazardous air pollutants (HAPs), and a PSD major source of air pollutants.

3. DESCRIPTION

This project addresses the following emissions unit(s):

Emissions Unit No.	Emissions Unit Description
014	Unit 7, Mechanical Draft Cooling Tower with a maximum circulation rate of 180,000 GPM.

3.1 PROJECT DESCRIPTION

The project involves the installation and subsequent operation of a new 14 cell cooling tower for Crist Unit 7. The existing 12 cell cooling tower for Unit 7 will need to be removed in order to make room for

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a new planned wet flue gas desulphurization (WFGD) scrubber system to comply with the future CAIR and CAMR regulations. The new cooling tower will be constructed on an area that is currently part of the cooling water intake canal. Brackish water with an average TDS value of 1,935 parts per million (as the cooling medium) and a design drift rate of 0.0005% of the circulating flow are proposed.

3.2 DESCRIPTION OF CURRENT STATUS

Fossil fuel steam generator unit 7 is a pulverized coal dry bottom, front and rear wall fired boiler. Steam generator unit 7 began commercial operation in 1973. This steam generating unit is constructed with a closed loop cooling system. Make up water for the system is drawn from an intake canal that is fed from the Escambia River.

4. PROJECT EMISSIONS

The following emission decreases are indicated by the applicant:

Pollutant	Past Actual Annual Emissions (TPY)	Future Potential Annual Emissions (TPY)	Net Change	PSD Threshold (TPY)	PSD Review Required
PM	1,400.38	3.82	-1,396.56	25	No
PM ₁₀	840.22	2.29	-837.93	15	No

Notes: The above calculations are based upon the paper "Calculating Realistic PM₁₀ Emissions from Cooling Towers" which is built upon the methodology presented in EPA's AP-42, the portion of PM which is emitted as PM₁₀ decreases as the TDS in the circulating water increases. For this project, the average TDS of the brackish water (1,935 ppm) results in about a 60% fraction of PM₁₀ emissions.

The Department does not render an opinion on the calculations of past actual emissions. However, it does recognize that the design of the new cooling tower (which includes drift eliminators with a drift rate of 0.0005%) will be much more efficient than the existing cooling tower that was not designed with drift eliminators, and that actual PM emissions will decrease as a result of this project.

5.0 PROJECT REVIEW

5.1 APPLICANT REVIEW

The applicant is proposing to build a new cooling tower that includes drift eliminators with a drift rate of 0.0005%, and a total circulating water flow usage limitation of 9.46E10 gallons per year (equivalent to 8,760 hours per year of full operation at 180,000 gallons per minute). This yields a maximum annual PM emissions of 3.82 TPY and a maximum annual PM₁₀ emissions of 2.29 TPY. The applicant states that the cooling tower meets the definition of an unregulated emissions unit pursuant to Rule 62-213. The applicant also states that Unit 7 is projected to experience a heat rate improvement of less than 1% during the summer months due to the more efficient thermal system, but this slight change in heat rate will not meaningfully impact the plant dispatch or change the load capability of the unit.

5.2 DEPARTMENT REVIEW

The Department has previously conducted BACT reviews via an inspection of the RACT/BACT/LAER Clearinghouse for mechanical draft cooling towers permitted between January 2003 and January 2006. Based upon these reviews, the Department has concluded that BACT for mechanical draft cooling towers is almost universally based upon drift eliminators. Additionally, BACT emission rates can be established as low as 0.0005%. It is noted that the lower end of the BACT range (0.0005%) is what the applicant has

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proposed for this project. Based on the maximum annual water flow rate and the historical annual average total dissolved solids concentration of 1,935 ppm, the expected annual particulate matter emissions from the new cooling tower would be:

$$180,000 \text{ gal/min} * 0.0005\% * 1,935 \text{ ppm} * 8.337 \text{ lb H}_2\text{O/gal} * 60 \text{ min/hr} * 8,760 \text{ Hrs/yr} * 1 \text{ ton/2000 lbs} = 3.82 \text{ tpy.}$$

At a PM₁₀ fraction of 60%, expected annual PM₁₀ emissions from the new cooling tower would be:

$$3.82 \text{ tpy} * 0.60 = 2.29 \text{ tpy}$$

At these levels of emissions based on the average TDS of the cooling water, the unit could potentially qualify as an insignificant emissions unit pursuant to Rule 62-213, F.A.C. However, it was noted in the application that the highest TDS of the cooling water was measured at 14,700 ppm. In the unlikely event that this level of TDS was recorded for an entire year, the PM emissions from the new cooling tower could potentially be as high as:

$$180,000 \text{ gal/min} * 0.0005\% * 14,700 \text{ ppm} * 8.337 \text{ lb H}_2\text{O/gal} * 60 \text{ min/hr} * 8,760 \text{ Hrs/yr} * 1 \text{ ton/2000 lbs} = 28.99 \text{ tpy.}$$

In order to be classified as an insignificant emissions unit in the Title V permit, potential emissions would have to remain below 5 tpy. The department agrees that because the new cooling tower does not use chromium as an additive to the cooling water, there are no specific applicable regulatory requirements that apply to the proposed cooling tower. Also, because the potential emissions could possibly exceed 5 tons per year, the new cooling tower will meet the requirements for classification as an unregulated emissions unit when it is added to the Title V permit.

6.0 CONCLUSION

Based on the foregoing technical evaluation of the application, the Department has made a determination that the proposed project is capable of meeting the Department's air emission standards.

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