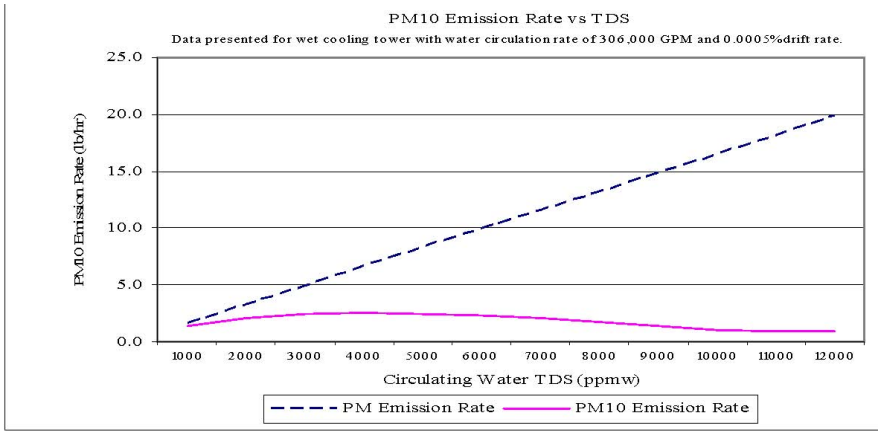
PSD Applicability for the Project

The Levy Nuclear Plant is a proposed PSD major stationary source located in Levy County, which is in an area that is currently in attainment with the state and federal AAQS or otherwise designated as unclassifiable. The applicant proposes to construct and operate two mechanical draft cooling towers to support nuclear Units 1 and 2. The cooling towers will emit particulate matter (PM) as a result of the carry over of solids (primarily salt) in the water droplet drift. The PM emissions include particles with a mean diameter of 10 microns or less (PM_{10}). Particulate matter will be controlled by the drift rate design specifications, which serve as a surrogate to control PM/PM_{10}.

Based on the application, future PM emissions are estimated to be 514 tons/year based on 8760 hours per year of operation, which makes the project new major stationary source subject to the preconstruction review requirements of Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality. PM emissions will exceed the significant emission rate of 25 tons per year, but PM_{10} emissions are estimated at 5.6 tons/year, which is less than the significant emissions rate of 15 tons/year. The PM/PM_{10} estimates are based upon the study, "Calculating Realistic PM10 Emissions from Cooling Towers" by Joel Reisman and Gordon Frisbie. According to the study, PM_{10} emissions increase with PM as the concentration of total dissolved solids (TDS) increases to about 4000 ppm. At TDS levels greater than 4000 ppm, the amount of PM_{10} sized particles will decrease while PM continues to increase. The paper states that at higher TDS, the drift droplets contain more solids and therefore, upon evaporation, result in larger particles for any given initial droplet size. Table 1 provides a graph of the correlation of PM and PM_{10} as a function of TDS in the circulating water.



With the estimated TDS of 25,000 ppm for the new cooling towers and a circulating flow rate of 531,100 gallons per minute, the report suggests large PM emissions with minimal PM_{10} emissions as indicated in the application. Since PM_{10} emissions will not exceed the significant emissions rate, a BACT determination is required for PM, but not PM_{10}. In addition, no air quality analysis is required because the modeled pollutant is PM_{10}, which is not subject to PSD preconstruction review for this project.

The project will also include construction of diesel-powered emergency generators, ancillary emergency generators and fire pumps. The emergency generators and fire pumps will operate for no more than 48 hours/year of non-emergency operation to ensure that each unit is functioning properly and available for emergency operation. Based on the applicant's original estimates, annual emissions from all of these units combined will be: of 16.4 tons/year of NO_X, 0.07 tons/year of SO_2, 3.5 tons/year of CO, 1.4 tons/year of VOC and 1.2 tons/year of PM/PM_{10}.

BACT Determination

The Department conducted a review of EPA's RACT/BACT/LAER Clearinghouse for mechanical draft cooling towers between 2003 and 2008. Based upon the review, the Department concludes that BACT for mechanical draft cooling towers is based upon drift eliminators. BACT has been established as low as 0.0005% drift rate. The Department agrees and BACT is determined to be a design drift rate of 0.0005% for the new cooling towers. For the diesel-powered emergency generators, ancillary emergency generators and fire pumps, the applicant proposes the use of ultra low sulfur diesel to minimize PM emissions. The Department agrees and BACT for these units is determined to be the firing of diesel with a maximum sulfur content of 0.00015% by weight.

Due to the extended construction schedule of the nuclear units, the applicant is required to submit a new BACT analysis and determination within two years prior to beginning construction of the cooling towers. If the Department's reassessment of BACT is substantially different from the initial determination, the applicant shall submit an application for a revised air construction permit, which will require a new Public Notice.