

# REACTOR OPERATION AND ENGINEERING

The reactor operated for 198 full power (20 MW) days during the past year or 54 % of real time that is equivalent to 77 % of the maximum available operating time. Routinely, the reactor is scheduled to operate on a seven week cycle, seven times a year. Each operating cycle includes 38 days on-line and 11 days shut-down for refueling, routine maintenance, and surveillance tests. This year, several major tasks became due and required additional shut-down time. Included among these are two shipments of spent fuel; replacement of the shim arm assemblies which required removal of the entire core and took only one month, half of that previously; and major modification to the refueling system projected to take two months which was completed in five weeks. In addition, corrective maintenance of the thermal shield and the thermal column cooling systems, refurbishing of the existing cooling tower to assure uninterrupted operation for at least two more years, and finally the biennial retraining, re-examination and requalification of all licensed operations personnel were conducted.

The major engineering effort the past year was the design and specification of a completely new plume-abatement cooling tower to be installed adjacent to the existing one. (Figure 1 compares examples of abated and non-abated cooling towers.) As well as being a larger capacity, more effective and more efficient system, the new tower eliminates vapor plumes down to -12 °C ambient. Construction of the new tower basin began in late September 2000 and should be completed before the end of the year. Fabrication of the tower is underway and scheduled for completion in the spring of 2001 to be followed by on-site installation, expected to take approximately four months. No reactor shutdown will be required during this period. The reactor will have to be shut down only for final hookup of electrical, controls, and piping connections and for acceptance and performance testing.



**FIGURE 1. No discernible cloud is emitted by the plume-abated cooling tower shown on the left compared to the plumes emerging from the non-abated towers on the right.**

Preparations for reactor re-licensing in 2004 for an additional 20 years are proceeding. They include preparation of an updated safety analysis report including seismic evaluation, an environmental report and impact statement, technical specifications and bases, operator requalification program and emergency and security plans. In-service inspections of reactor internals and ultrasonic testing of the primary cooling system plus upgrade of older systems and components will be needed in support of the application for license renewal. Many of the upgrades have already been completed or are in progress. Among the major upgrades planned over the next few years are complete replacement of the nuclear instrumentation panel and associated safety and control systems, complete replacement of the electrical power systems and associated switch gear and replacement and upgrade of the reactor emergency power supply systems.