UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATING TO THE NUMBER OF INCORE THIMBLES OPERABLE FOR
DUQUESNE LIGHT COMPANY
BEAVER VALLEY POWER STATION UNIT 2
DOCKET NO. 50-412

## BACKGROUND

By letter dated January 13, 1988, Duquesne Light Co. proposed a temporary change to the Beaver Valley Power Station Unit No. 2, Technical Specification 3.3.3.2 to relax the required number of incore detector thimbles from 75% to 50%. Presently, 12 of the 50 incore thimbles are plugged. This change would last only until the plant is shutdown for a period long enough to unplug the thimbles. The licensee has proposed increased uncertainty factors to be applied to the peaking factors if flux maps are taken with fewer than 75% of the thimbles. A similar change was made to the Beaver Valley Unit 1 Cycle 3 Technical Specifications when a similar problem occurred at that unit.

## EVALUATION

Essentially, all PWR Technical Specifications contain a requirement of operability of 75% of the incore detector locations for periodic mapping of the core power distribution. On several occasions, for various reasons, failures in operating PWRs have approached or exceeded 25% and a relaxation of the 75% requirement has been permitted for the remainder of the affected operating cycle.

The licensee's proposed change allows for the increase in the moveable incore map measurement uncertainty above the 5% normal allowance by the relationship $5\% + [3-(T/12.5)]*2\%$ where T is the number of available detectors. This

relationship increases the uncertainty allowance to 7% when only half of the thimbles are used. The uncertainty in the measurement of $F^N_{\Delta H}$ is 4% and is proposed to be increased by the relationship 4% + [3-(T/12.5)]*1%. These are the same allowances as were proposed and approved for Beaver Valley Unit 1 Cycle 3(Amendment No. 61, dated January 19, 1983).

The licensee has provided the results of recent core maps which show that currently there is approximately 24% margin in total core peaking factor and 9.1% margin in the $F^N_{\Delta H}$ to the Technical Specification limits for steady state operating conditions. Since the unit does not load-follow and both the total core peaking factor and $F^N_{\Delta H}$ normally tend to decrease with burnup, we conclude that these margins, along with the proposed increases in measurement uncertainty, are sufficient to preclude the concern that monitoring of the limits could fail to detect a problem for the remainder of the operating cycle.

Another safety concern relating to degradation of incore mapping ability is the ability to detect anomalous conditions in the core. One of these is inadvertent loading of a fuel assembly into an improper position. Since this is a loading problem, it is not of concern for the remainder of the operating cycle. Most other anomalous conditions produce either an axial or radial effect, which would cause either a change in quadrant tilt ratio or axial offset ratio. These are monitored by the excore detectors. Should an excore detector become unavailable, the licensee has indicated that lowering power would be the option taken. Furthermore, the core exit thermocouples in the reactor provide a useful supplement to the incore detectors to detect problems.

The licensee has indicated that the cause of the thimble plugging was most likely the same as that which caused the problem in Unit 1 Cycle 3. The

solution for the Unit 1 problem should solve the Unit 2 problem. The licensee has agreed to try to unplug the plugged thimbles at the first shutdown with sufficient time to accomplish it. At the very latest, this problem will be solved during the Cycle 1/2 reload.

Our review of the suitability of operation of the Beaver Valley Unit 2 reactor with a reduced number of moveable incore thimble locations to as few as 50% indicates that adequate margin exists at this time in Cycle 1 and sufficiently increased uncertainty allowance has been made to insure that Technical Specification peaking factor limits will be met. In addition, there are adequate supplemental indicators of anomalous conditions to preclude an unsafe condition from escaping detection in the absence of full incore detector mapping capability. We therefore, conclude that the proposed Technical Specification change is acceptable.

CONCLUSION

Based on the above evaluation, we conclude that the proposed technical specification change is acceptable. However, the licensee recently informed us that the conditions that resulted in the need for the proposed change no longer exist. Therefore, no amendment is issued; this safety evaluation is issued only for information. If the need arises during this fuel cycle, and if this safety evaluation can still be shown to be applicable, an amendment will be issued.

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Dated MAY 24 1988