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DUKE POWER

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U. S. Nuclear Regulatory Commission
Washington, D. C. 20555
Attention: Document Control Desk

Subject: McGuire Nuclear Station
Docket Numbers 50-369 and -370
Catawba Nuclear Station
Docket Numbers 50-413 and -414
Proposed Technical Specification Changes to Relocate Specific Boron Concentration Values to the Core Operating Limits Report; Supplemental Information

By letter dated May 24, 1994, Duke Power Company submitted proposed Technical Specification changes for McGuire and Catawba Nuclear Stations which would relocate values of required boron concentrations from Technical Specifications to the Core Operating Limits Report. NRC review of the proposed changes has indicated that additional information is required to complete their review. Accordingly, attached is the requested information.

Attachment I contains a description of the methodology used to determine spent fuel pool and refueling canal boron concentrations. Attachment II contains corrected Technical Specification mark-ups.

If you require additional information, please call Scott Gewehr at (704) 382-7581.

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## ATTACHMENT 1

In conversations with the NRC staff regarding the Reference 1 submittal, questions have arisen as to the approved methodology utilized by Duke Power for determining the spent fuel pool and refueling canal minimum boron concentrations. The purpose of this letter is to further clarify the connection between spent fuel pool and refueling canal minimum boron concentrations and the methodology given in DPC-NE-2010A (Reference 2).

In a January 13, 1993 submittal (Reference 3), Duke Power requested, among other things, that the boron concentration limits for the refueling water storage tank (RWST) and cold leg accumulators (CLAs) be moved from the Technical Specifications to the Core Operating Limits Reports (COLR) for the McGuire and Catawba Nuclear Stations. The NRC subsequently approved these requests via issuance of References 4 and 5. During reload analyses, the limiting calculation for determining the RWST and CLA minimum boron concentrations involves the post-LOCA subcriticality evaluation. During a large break LOCA event, borated water contributions from the reactor coolant system, RWST, CLAs, ECCS piping and the ice condenser are mixed together in the reactor building sump. The boron concentration of this mixed solution should be high enough to ensure core subcriticality once the sump recirculation phase of the event is initiated. Currently, no credit is taken for control rod insertion to guarantee subcriticality during this evaluation. Duke Power utilizes the methodology presented in DPC-NE-2010A to determine the all-rods-out critical boron concentrations for comparison to the boron concentration of the mixed sump solution. If the boron concentration of the mixed sump solution is greater than the all-rods-out critical boron concentration, core subcriticality is guaranteed.

With the transition to longer cycle lengths (i.e., more reactive cores), the RWST and CLA minimum boron concentrations are required to increase in order to satisfy the post-LOCA subcriticality evaluation. During refueling operations, the refueling canal is filled with borated water from the RWST. During fuel transfer, the borated water in the refueling canal can mix with the borated water in the spent fuel pool. After the refueling outage, the refueling canal is drained, with the borated water being returned to the RWST. Thus, it is desirable to have the minimum boron concentrations for the RWST, refueling canal and spent fuel pool the same in order to prevent a dilution in the RWST boron concentration once the RWST is refilled. Duke Power has adopted this approach in order to preclude a possible Technical Specification violation on minimum RWST boron concentration.

It should also be emphasized that the minimum boron concentration determined for the RWST will be greater than that required to ensure adequate subcriticality margin in the refueling canal and spent fuel pool. In general, soluble boron is not credited for spent fuel storage criticality calculations. Based on Technical Specification 3.9.1 for McGuire and Catawba, the boron concentration of the water volume having direct access to the reactor vessel during refueling operations must be greater than that required to maintain a core $K_{eff}$ of 0.95 or less, or greater than the minimum boron concentration of the RWST, since RWST water fills the refueling canal. The boron concentration required to keep the core $K_{eff}$ less than or equal to 0.95 during refueling operations is calculated utilizing the methodology given in Reference 2. During reload analyses, it has been found that the minimum RWST boron concentration determined to satisfy the post-LOCA

subcriticality evaluation is more limiting (i.e., larger) than that required to keep the core $K_{eff}$ less than or equal to 0.95 during refueling operations (Mode 6).

**References**


1. Letter from M. S. Tuckman (Duke) to USNRC, "McGuire Nuclear Station, Docket Numbers 50-369 and -370, Catawba Nuclear Station, Docket Numbers 50-413 and -414, Proposed Technical Specification Changes to Relocate Specific Boron Concentration Values to the Core Operating Limits Report," May 24, 1994.

2. DPC-NE-2010A, "Nuclear Physics Methodology for Reload Design," June, 1985.

3. Letter from M. S. Tuckman (Duke) to USNRC, "Catawba Nuclear Station, Docket Nos. 50-413 and 50-414, McGuire Nuclear Station, Docket Nos. 50-369 and 50-370, Technical Specification Amendment, Relocation of Cycle-Specific Parameter Limits," January 13, 1993.

4. Letter from Robert E. Martin (NRC) to D. L. Rehn (Duke), "Issuance of Amendments - Catawba Nuclear Station, Units 1 and 2, Cycle Specific Parameters to the Core Operating Limits Report (TAC Nos. M85472 and M85473)," March 25, 1994.

5. Letter form Victor Nerses (NRC) to T. C. McMeekin (Duke), "Issuance of Amendments - McGuire Nuclear Station, Units 1 and 2, (TAC Nos. M85474 and M85475)," May 31, 1994.

ATTACHMENT IIa
Technical Specification Markups
McGuire