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MIDDLE SOUTH UTILITIES SYSTEM

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October 23, 1989

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

Subject: Request for Additional Information Concerning
NPF-38-101, Technical Specification
3.2.1.9: Boron Dilution

Gentlemen:

During a telephone conversation on October 11, 1989, members of the NRC staff asked for additional information concerning the boron dilution analysis supporting proposed technical specification NPF-38-101, dated October 5, 1989. As stated in this conversation, LP&L has employed the same method for analyzing the boron dilution event since Cycle 2. The NRC accepted this method (explained by W3P86-3386, dated November 3, 1986) in the safety evaluation report for Amendment 9 to Waterford's technical specifications. The same analysis method supports NPF-38-101.

Specification 3.1.2.9 guards against a boron dilution event by either requiring early warning systems, or restricting potential means for diluting the boron concentration of the reactor coolant system. The boron dilution event analysis gives the time to criticality for all combinations of: MODES 3 to 6, OPERABLE charging pumps, and initial k_{eff}. The exact time-to-criticality numbers for Cycle 3 appear in a letter sent to the NRC on August 3, 1988 (re W3P88-1200). In contrast, Specification 3.1.2.4 ensures at least one system can provide a SHUTDOWN MARGIN of 2.0%Δk/k after xenon decay and RCS cooldown to 200°F. These specifications are related because the same system that can inject dissolved boric acid can also pump-in diluting primary makeup water.

The proposed 3.1.2.9.a restrictions on charging pumps while all boron dilution alarms are OPERABLE, are based on assumed operator response times consistent with Standard Review Plan 15.4.6 (i.e., fifteen minutes for MODES 3, 4, and 5). When one or both boron dilution alarms are inoperable, the analysis adds a time delay because (assuming a single failure) operators might not quickly realize that a boron dilution event had started. The minimum acceptable time before criticality is thus

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45 minutes, i.e., 15 minutes from SRP 15.4.6 and 30 minutes to draw and measure the boron concentration of a reactor coolant sample. Thus, for MODES 3, 4, and 5, the guidance of proposed 3.1.2.9.a is based on a much earlier warning from the dilution alarms (compared to sampling and measuring). By following 3.1.2.9.a, the early warning allows the operator to terminate the event just fifteen minutes after the alarm sounds. The charging pump restrictions and sampling frequencies on Tables 3.1-1 through 3.1-5 are based on relatively late event identification. (See W3P85-3386 sent to the NRC on November 3, 1986, which also discusses this subject.)

The proposed amendment is based upon a Combustion Engineering analysis which conservatively bounded Cycle 3 conditions. The analysis also conservatively bounds Cycle 4 conditions and thus forms a valid basis for the proposed amendment.

As has been discussed on October 11, 1989, NPF-38-101 simply re-establishes the principle that neutron flux instruments can give operators early warning of a boron dilution event. Both the current and proposed Specification 3.1.2.9.a require two OPERABLE boron dilution alarms; therefore, concurrent restrictions imposed by Tables 3.1-1 through 3.1-5 are unnecessary. Operators shall only implement restrictions given on the five tables when a boron dilution alarm is declared inoperable. Using more of what the time-to-criticality analysis allows, NPF-38-101 eliminates the current conflict between 3.1.2.4 and 3.1.2.9.b without sacrificing any safety margins.

Should you have any questions or comments on this issue, please feel free to contact Steven E. Farkas at (504) 464-3383.

Very truly yours,

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