UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 5, 2012

Mr. Brian J. O'Grady
Vice President-Nuclear and CNO
Nebraska Public Power District
72676 648A Avenue
Brownville, NE 68321

SUBJECT: COOPER NUCLEAR STATION - REQUEST FOR ADDITIONAL INFORMATION RE: LICENSE AMENDMENT REQUEST TO REVISE TECHNICAL SPECIFICATIONS – SAFETY LIMIT MINIMUM CRITICAL POWER RATIO (TAC NO. ME8853)

Dear Mr. O'Grady:

By letter dated May 30, 2012, Nebraska Public Power District submitted a license amendment request (LAR) to revise Technical Specifications Section 2.0, for Cooper Nuclear Station. The proposed LAR would revise the Safety Limits Minimum Critical Power Ratio for two recirculation loop from 1.10 to 1.11 and single recirculation loop from 1.12 to 1.13.

The NRC staff has reviewed your submittal and determined that additional information is needed for the staff to complete its evaluation. This request was transmitted via e-mail to Mr. Edward McCutchen of your staff on August 14, 2012. Mr. McCutchen indicated via telephone on August 21, 2012, that the licensee's response would be provided within 30 days of receipt of this letter.

If you have any questions, please contact me at 301-415-1377 or via e-mail at Lynnea.Wilkins@nrc.gov.

Sincerely,

Lynnea E. Wilkins, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-298

Enclosure:
Request for Additional Information

cc w/encl: Distribution via Listserv

REQUEST FOR ADDITIONAL INFORMATION

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

SAFETY LIMIT MINIMUM CRITICAL POWER RATIO UPDATE

DOCKET NO. 50-298

BACKGROUND

By letter dated May 30, 2012 (Agencywide Documents Access and Management System Accession No. ML12157A206), Nebraska Public Power District (the licensee), submitted an application for Cooper Nuclear Station (CNS) to revise Technical Specifications Section 2.0. This change would revise the Safety Limits Minimum Critical Power Ratio (SLMCPR) for two recirculation loop from ≥1.10 to ≥1.11 and single recirculation loop from ≥1.12 to ≥1.13. The licensee provided two supporting enclosures, a report by Global Nuclear Fuels America (GNF-A) and a report by Studsvik Scandpower, Inc (SSP).

The NRC staff has reviewed your submittal and has determined that the following information is needed to complete its review:

ISSUE

Since the SLMCPR is determined using a process that statistically convolutes various uncertainties, the staff needs to verify that the statistical parameters that are used as inputs to the process are valid and applicable to the Cooper operating cycle.

REGULATORY BASIS

NUREG-0800, "Standard Review Plan [SRP] for the Review of Safety Analysis for Nuclear Power Plants," Chapter 4.4 states as follows regarding the limiting value of critical power ratio (CPR) correlations:

> The limiting (minimum) value of CPR correlations is to be established such that at least 99.9 percent of the fuel rods in the core will not experience a boiling transition during normal operation or AOOs [anticipated operational occurrences].

The information in the SRP describes adherence to General Design Criterion (GDC) 10 from Appendix A to Part 50 of the Title 10 *Code of Federal Regulations*:

> The reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effect of anticipated operational occurrences.

Regarding the connection between the SRP review guidance and GDC 10, the licensee stated:

> As part of a reload core design, cycle specific transient analyses are performed to determine the required SLMCPR and the change in Critical Power Ratio (CPR) [ΔCPR] for specific transients. To ensure that adequate margin is maintained, a design requirement based on a statistical analysis was selected in that moderate frequency transients caused by a single operator error or equipment malfunction shall be limited such that, considering uncertainties in manufacturing and monitoring the core operating state, at least 99.9% of the fuel rods would be expected to avoid boiling transition. The lowest allowable transient MCPR limit which meets the design requirement is termed the fuel cladding integrity SLMCPR.

CNS was licensed prior to the 1971 issuance of the current GDC. Instead of conforming specifically to the 1971 GDC, CNS instead conforms to the proposed Principal Design Criteria, issued in 1967, by the Atomic Energy Commission (AEC). This conformance is described in CNS Updated Safety Analysis Report (USAR) Appendix F. The AEC concluded that CNS design conforms to the intent of the modern GDC. The analogous criterion, Criterion 6, *Reactor Core Design*, of Group II, *Protection by Multiple Fission Product Barriers*, of the 1967 Proposed GDC states:

> The reactor core shall be designed to function throughout its design lifetime, without exceeding acceptable fuel damage limits which have been stipulated and justified. The core design, together with reliable process and decay heat removal systems shall provide for this capability under all expected conditions of normal operation with appropriate margins for uncertainties and for transient situations which can be anticipated, including the effects of the loss of power to recirculation pumps, tripping out of a turbine generator set, isolation of the reactor from its primary heat sink, and loss of all offsite power.

The licensee explains the tie between the SLMCPR and Criterion 6 of USAR Appendix F as follows:

> Using the sum of maximum ΔCPR and cycle specific SLMCPR to determine the OLMCPR preserves compliance with Criterion 6 of the CNS USAR Appendix F, and the equivalent GDC 10. CNS continues to meet Criterion 6 from the CNS USAR Appendix F.

REQUEST

The staff is requesting additional information to verify that the statistical analysis is based on parameters that are applicable to the proposed CNS core design. The staff's review includes gathering additional information concerning cycle design changes that may be causing the SLMCPR to change, confirming the applicability of relevant statistical databases to CNS specifically, and obtaining additional information as necessary to confirm that SSP inputs are appropriate in the GEH SLMCPR calculative process.

1. In Section 2.8 of Enclosure 2 to the May 30, 3012, application letter, it is stated (non-proprietary) that the licensee requested the application of General Electric Thermal Analysis Basis power distribution methodology and uncertainties, and that a separate enclosure provides the basis for application of this methodology and these uncertainties for the GARDEL core monitoring system. The applicable uncertainty terms, which relate to core monitoring capabilities under various equipment availability scenarios, do not appear to be directly comparable. Please provide information to facilitate a comparison between SSP-calculated uncertainty parameters and those provided in Table 5 of the GNF report.

2. Please explain the basis for the batch fraction change and how it affects the SLMCPR result.

3. Please provide information or data to confirm that observed channel bow at CNS is within the bounding value assumed in the SLMCPR analysis.

4. Regarding the fuel channeling practices in use at CNS, which require the use of new fuel channels on new fuel assemblies, please confirm or verify that this practice has been employed for all fuel currently in the core, such that all fuel in the core began its first cycle with a fresh fuel channel.

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ADAMS Accession No.: ML12235A252 ***via memo dated August 1, 2012**

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