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NLS2007032
August 10, 2007

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Subject: License Amendment Request to Revise Technical Specifications - Safety Limit Minimum Critical Power Ratio
Cooper Nuclear Station, Docket 50-298, DPR-46

Dear Sir or Madam:

The purpose of this letter is for the Nebraska Public Power District (NPPD) to request an amendment to Facility Operating License DPR-46 in accordance with the provisions of 10 CFR 50.4 and 10 CFR 50.90 to revise the Cooper Nuclear Station (CNS) Technical Specifications (TS). This proposed change to TS Section 2.0, Safety Limits, will revise two recirculation loop and single recirculation loop Safety Limit Minimum Critical Power Ratio (SLMCPR) values to reflect results of a cycle specific calculation.

Attachment 1 provides a description of the TS change, the basis for the amendment, the no significant hazards consideration evaluation pursuant to 10 CFR 50.91(a)(1), and the environmental impact evaluation pursuant to 10 CFR 51.22. Attachments 2 and 3 provide the revised page in markup and clean typed formats, respectively. No Bases pages are affected by this amendment request.

This proposed change is supported by a report prepared by Global Nuclear Fuel - Americas (GNF-A). This report contains information considered by GNF-A to be proprietary as described in 10 CFR 2.390(a)(4). Specific proprietary text is enclosed within double brackets. It is requested that this information be withheld from public disclosure. The proprietary and non-proprietary versions of the GNF-A report are included as Enclosures 1 and 2, respectively. An affidavit executed by an official of GNF-A requesting withholding from public disclosure in accordance with 10 CFR 2.390(b)(1) is provided as Enclosure 3.

This proposed change is also supported by a report prepared by Studsvik Scandpower, Inc (SSP). This report contains information considered by SSP to be proprietary as described in 10 CFR 2.390(a)(4). Specific proprietary text is enclosed within double brackets. It is requested that this information be withheld from public disclosure. The proprietary and non-proprietary versions of the SSP report are included as Enclosures 4 and 5, respectively. An affidavit executed by an

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official of SSP requesting withholding from public disclosure in accordance with 10 CFR 2.390(b)(1) is provided as Enclosure 6.

NPPD requests Nuclear Regulatory Commission (NRC) approval of the proposed TS change and issuance of the requested license amendment by December 19, 2007. This change is needed to ensure unrestricted full power operation for the remainder of the current operating cycle (Cycle 24). Further, the core for the next operating cycle is being designed based on the requested values of SLMCPR. Once approved, the amendment will be implemented within 30 days.

This proposed TS change has been reviewed by the necessary safety review committees (Station Operations Review Committee and Safety Review and Audit Board). Amendments to the CNS Facility Operating License through Amendment 226, issued October 31, 2006, have been incorporated into this request. NPPD has concluded that the proposed changes do not involve a significant hazards consideration and that they satisfy the categorical exclusion criteria of 10 CFR 51.22(c).

This request is submitted under oath pursuant to 10 CFR 50.30(b). By copy of this letter and its attachments, the appropriate State of Nebraska official is notified in accordance with 10 CFR 50.91(b)(1). Copies to the NRC Region IV office and the CNS Resident Inspector are also being provided in accordance with 10 CFR 50.4(b)(1).

Should you have any questions concerning this matter, please contact Mr. Paul Fleming at (402) 825-2774.

I declare under penalty of perjury that the foregoing is true and correct.

Executed On: 8/10/07
Date

Sincerely,

Stewart B. Minahan
Vice President Nuclear and
Chief Nuclear Officer

/rr

Attachments
Enclosures

cc: Regional Administrator w/ attachments and enclosures
USNRC - Region IV

Cooper Project Manager w/ attachments and enclosures
USNRC – NRR Project Directorate IV-1

Senior Resident Inspector w/ attachments and enclosures
USNRC – CNS

Nebraska Health and Human Services w/ attachments and enclosures
Department of Regulation and Licensure

NPG Distribution w/o attachments or enclosures

CNS Records w/ attachments and enclosures

ATTACHMENT 1

NPPD Evaluation

License Amendment Request to Revise Technical Specifications Safety Limit Minimum Critical Power Ratio

Cooper Nuclear Station
NRC Docket 50-298, License DPR-46

Revised Technical Specification Page

2.0-1

1.0 DESCRIPTION

This letter is a request for amendment of Operating License DPR-46 for Cooper Nuclear Station (CNS). The proposed change is to revise the value of the Safety Limit Minimum Critical Power Ratio (SLMCPR) for both two recirculation loop operation (TLO) and single recirculation loop operation (SLO) in Technical Specification (TS) 2.1.1.2 based on analysis performed for CNS operation in Cycle 24.

This change is needed to ensure unrestricted full power operation of CNS during the current Operating Cycle 24. The reactor core for Operating Cycle 25 is being designed based on the requested values of SLMCPR. As a result these values may be bounding for Cycle 25, scheduled to begin May 2008. Once approved, the amendment will be implemented within 30 days.

2.0 PROPOSED CHANGE

This license amendment request proposes to revise TS 2.1.1.2 by changing the value of Minimum Critical Power Ratio (MCPR) for TLO from ≥ 1.12 to ≥ 1.10 and the value of MCPR for SLO from ≥ 1.14 to ≥ 1.12. No changes to the associated Bases are needed.

3.0 BACKGROUND

The safety design basis provided in Updated Safety Analysis Report (USAR) Section III-7 is that the thermal hydraulic design of the core shall establish a thermal hydraulic safety limit for use in evaluating the safety margin relating the consequences of fuel barrier failure to public safety. To ensure that adequate margin is maintained, a design requirement based on a statistical analysis was selected as follows. 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.

A plant unique operating limit MCPR is established to provide adequate assurance that the fuel cladding integrity SLMCPR is not exceeded for any anticipated operational transients. The operating limit MCPR is obtained by adding the maximum delta critical power ratio (CPR) value for the most limiting transient postulated to occur at the plant to the fuel cladding integrity SLMCPR.

Cycle specific delta critical power ratio values are determined as part of the reload analysis and are reported in the Supplemental Reload Licensing Report.

The CNS Cycle 24 core has 548 GE14 fuel assemblies. Cycle 24 is scheduled to end the middle of April 2008.

4.0 TECHNICAL ANALYSIS

Analyses have been performed which show that at least 99.9% of the fuel rods in the core are expected to avoid boiling transition (and, therefore, cladding damage due to overheating) if the MCPR is equal to or greater than the fuel cladding integrity SLMCPR.

The proposed changes to the SLMCPR values are based on an analysis by Global Nuclear Fuels - Americas (GNF-A) for CNS Cycle 24 operations. The GNF-A report, eDRF-0000-0046-6413, "GNF Additional Information Regarding the Requested Changes to the Technical Specification SLMCPR," dated May 4, 2006, supports changing the TLO value of SLMCPR from 1.12 to 1.09, and the SLO value of SLMCPR from 1.14 to 1.11. As a conservative measure, a margin of 0.01 is being added to these values. With the added margin of 0.01, the value requested for TLO SLMCPR is 1.10, and the value requested for SLO SLMCPR is 1.12. These values may be bounding for Cycle 25 since they are being used in designing the core for that cycle. These values are based on NRC approved methods and procedures. Proprietary and non-proprietary versions of the GNF-A report are included as Enclosures 1 and 2, respectively.

The GNF-A analyses include an uncertainty to account for an increase in channel bow due to control blade shadow corrosion-induced channel bow. CNS has not experienced channel bow. The current practice at CNS is to place a new fuel channel on each fresh fuel assembly when it is initially loaded into the core. In accordance with this practice, a new fuel channel was placed on each fresh fuel assembly that was loaded into the core for Cycle 24. Current procedures require installation of new fuel channels on new fuel assemblies. These procedures will ensure that a new fuel channel is installed on the new fuel assemblies that will be loaded into the core for Cycle 25, and for subsequent cycles. By previous docketed correspondence (Reference 7.6) NPPD committed to submit justification that the higher R-factor is sufficiently conservative so that the SLMCPR value is not invalidated if there is evidence that channel bow is occurring such that the approved basis for the R-factor uncertainty is exceeded.

The uncertainties in the adaptive relative power distribution were evaluated by Studsvik Scandpower (SSP). The methodology used for this evaluation and the results are described in the report SSP-07/405-C, "GARDEL BWR – Cooper Nuclear Station – Power Distribution Uncertainties," Revision 1, dated May 11, 2007. Proprietary and non-proprietary versions of the SSP report are included as Enclosures 4 and 5, respectively.

The required information to justify this requested change to the SLMCPR values is provided in the GNF-A and SSP reports.

5.0 REGULATORY SAFETY ANALYSIS

Appendix A to Part 50 of Title 10 of the Code of Federal Regulations (CFR) is titled "General Design Criteria for Nuclear Power Plants." General Design Criterion (GDC) 10, Reactor Design, from Section II, *Protection by Multiple Fission Product Barriers*, states:

> *"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 effects of anticipated operational occurrences."*

The fuel cladding must not sustain damage as a result of normal operation and abnormal operational transients. The reactor core safety limits are established to preclude violation of the fuel design criterion that at least 99.9% of the fuel rods in the core would not be expected to experience the onset of transition boiling.

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.

NUREG-0800, Standard Review Plan, Section 4.4, "Thermal and Hydraulic Design," Acceptance Criterion No. 1.b, states, in part, that the limiting (minimum) value of CPR is to be established such that at least 99.9% of the fuel rods in the core would not be expected to experience departure from nucleate boiling during normal operation or anticipated operational occurrences.

A plant unique operating limit MCPR (OLMCPR) is established to provide adequate assurance that the fuel cladding integrity SLMCPR is not exceeded for any anticipated operational transients. The OLMCPR is obtained by adding the maximum value of ΔCPR for the most limiting transient postulated to occur at the plant to the fuel cladding integrity SLMCPR.

5.1 No Significant Hazards Consideration

10 CFR 50.91(a)(1) requires that licensee requests for operating license amendments be accompanied by an evaluation of significant hazard posed by issuance of an amendment. Nebraska Public Power District (NPPD) has evaluated this proposed amendment with respect to the criteria given in 10 CFR 50.92(c).

The proposed change would revise the Cooper Nuclear Station (CNS) Operating License by decreasing the values of the Safety Limit Minimum Critical Power Ratio (SLMCPR) for both two recirculation loop operation (TLO) and single recirculation loop operation (SLO) in Technical Specification 2.1.1.2. The TLO value of SLMCPR is decreased from 1.12 to 1.10 and the SLO value of SLMCPR

is decreased from 1.14 to 1.12. The revised values of SLMCPR are based on analyses performed by Global Nuclear Fuels – Americas (GNF-A) to determine the SLMCPR for the current operating cycle, as supported by analyses performed by Studsvik Scandpower (SSP).

1. **Do the proposed changes involve a significant increase in the probability or consequences of an accident previously evaluated?**

   Response: No.

   Four accidents have been evaluated previously as reflected in the CNS Updated Safety Analysis Report (USAR). These four accidents are (1) loss-of-coolant, (2) control rod drop, (3) main steamline break, and (4) fuel handling. The probability of an evaluated accident is derived from the probabilities of the individual precursors to that accident. Changing the SLMCPR does not increase the probability of an evaluated accident. The change does not require any physical plant modifications to the plant or any components, nor does it require a change in plant operation. Therefore, no individual precursors of an accident are affected.

   The consequences of an evaluated accident are determined by the operability of plant systems designed to mitigate those consequences. This proposed change makes no modification to the design or operation of the systems that are used in mitigation of accidents. Limits have been established, consistent with NRC approved methods, to ensure that fuel performance during normal, transient, and accident conditions is acceptable. The proposed change to the value of the SLMCPR continues to conservatively establish this safety limit such that the fuel is protected during normal operation and during any plant transients or anticipated operational occurrences.

   Based on the above NPPD concludes that the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. **Do the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?**

   Response: No.

   Creation of the possibility of a new or different kind of accident from an accident previously evaluated would require creation of precursors of that accident. New accident precursors may be created by modification of the plant configuration or changes in how the plant is operated. The proposed change does not involve a modification of the plant configuration or in

how the plant is operated. The proposed change to the SLMCPR assures that safety criteria are maintained.

Based on the above, NPPD concludes that the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. Do the proposed changes involve a significant reduction in a margin of safety?

Response: No.

The value of the proposed SLMCPR provides a margin of safety by ensuring that no more than 0.1% of the rods are expected to be in boiling transition if the Minimum Critical Power Ratio limit is not violated. The proposed change will ensure the appropriate level of fuel protection is maintained. Additionally, operational limits are established based on the proposed SLMCPR to ensure that the SLMCPR is not violated during all modes of operation. This will ensure that the fuel design safety criteria (i.e., that at least 99.9% of the fuel rods do not experience transition boiling during normal operation as well as anticipated operational occurrences) are met.

Based on the above, NPPD concludes that the proposed changes do not involve a significant reduction in a margin of safety.

From the above discussions, NPPD concludes that the proposed amendment involves no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

CNS was designed and constructed to meet the intent of the 70 General Design Criteria (GDC) issued by the Atomic Energy Agency (AEC), as originally proposed in July, 1967. These GDCs constitute the licensing basis for CNS, except where specific commitments have been made to the 1971 GDCs. The AEC conducted their technical review of the CNS design against the July, 1971 GDC, and concluded that the CNS design conforms to the intent of the 1971 GDCs.

The 1967 Proposed GDC and CNS conformance with the criteria are discussed in Appendix F of the CNS Updated Safety Analysis Report (USAR). Group II of the 1967 Proposed GDC is titled Protection by Multiple Fission Product Barriers. Criterion 6, of Group II, is titled Reactor Core Design. This criterion 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 equivalent criterion from the 1971 GDC, 10 CFR 50 Appendix A, is Criterion 10, Reactor Design. Using the sum of the 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.

6.0 ENVIRONMENTAL CONSIDERATION

10 CFR 51.22(c) provides categories of actions which are categorical exclusions from performing an environmental assessment. An action which is a categorical exclusion does not require an environmental assessment or an environmental impact statement. 10 CFR 51.22(c)(9) allows as a categorical exclusion issuance of an amendment to a license for a reactor pursuant to 10 CFR Part 50 which changes a surveillance requirement provided that (1) the amendment involves no significant hazards consideration, (2) there is no significant change in the types or significant increase in the amounts of any effluents that may be released off-site, and (3) there is no significant increase in individual or cumulative occupational radiation exposure.

NPPD has reviewed the proposed license amendment and concludes that it meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(c), no environmental impact statement or environmental assessment needs to be prepared in connection with issuance of the proposed license changes. The basis for this determination is as follows:

1. The proposed license amendment does not involve significant hazards as described previously in the No Significant Hazards Consideration Evaluation.

2. The proposed license amendment does not introduce any new equipment, nor does it require any existing equipment or systems to perform a different type of function than they are presently designed to perform. NPPD has concluded that this proposed change does not result in a significant change in the types or significant increase in the amounts of any effluents that may be released off-site.

3. These changes do not adversely affect plant systems or operation and therefore, do not significantly increase individual or cumulative occupational radiation exposure beyond that already associated with normal operation.

7.0 REFERENCES

7.1 NEDE-24011-P-A, General Electric Standard Application for Reactor Fuel (Revision 15).

7.2 NEDC-32601P-A, Methodology and Uncertainties for Safety Limit MCPR Evaluations (August 1999).

7.3 NEDC-32694P-A, Power Distribution Uncertainties for Safety Limit MCPR Evaluations (August 1999).

7.4 NEDC-32505P-A, R-Factor Calculation Method for GE11, GE12, and GE13 Fuel (Revision 1, July 1999).

7.5 NEDO-10958-A, General Electric BWR Thermal Analysis Basis (GETAB): Data, Correlation, and Design Application (January 1977).

7.6 Letter from Randall K. Edington, Nebraska Public Power District, to U.S. Nuclear Regulatory Commission, dated January 26, 2005, "Regulatory Commitment Related to Control Rod Shadow Corrosion-Induced Channel Bow."

ATTACHMENT 2

Proposed Technical Specifications Revisions – Markup Format

Cooper Nuclear Station
NRC Docket 50-298, License DPR-46

Revised Technical Specification Page

2.0-1

2.0 SAFETY LIMITS (SLs)

2.1 SLs

2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be ≤ 25% RTP.

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow ≥ 10% rated core flow:

MCPR shall be ≥ ~~1.12~~ 1.10 for two recirculation loop operation or ≥ ~~1.14~~ 1.12 for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be ≤ 1337 psig.

2.2 SL Violations

With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

ATTACHMENT 3

Proposed Technical Specifications Revisions – Final Typed Format

Cooper Nuclear Station
NRC Docket 50-298, License DPR-46

Revised Technical Specification Page

2.0-1

2.0 SAFETY LIMITS (SLs)

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2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:

THERMAL POWER shall be ≤ 25% RTP.

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow ≥ 10% rated core flow:

MCPR shall be ≥ 1.10 for two recirculation loop operation or ≥ 1.12 for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

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Reactor steam dome pressure shall be ≤ 1337 psig.

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With any SL violation, the following actions shall be completed within 2 hours:

2.2.1 Restore compliance with all SLs; and

2.2.2 Insert all insertable control rods.

0.ATTACHMENT 3 LIST OF REGULATORY COMMITMENTS©

Correspondence Number: NLS2007032

The following table identifies those actions committed to by Nebraska Public Power District (NPPD) in this document. Any other actions discussed in the submittal represent intended or planned actions by NPPD. They are described for information only and are not regulatory commitments. Please notify the Licensing Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITMENT NUMBER	COMMITTED DATE OR OUTAGE
None		