April 27, 2006

Mr. Randall K. Edington
Vice President-Nuclear and CNO
Nebraska Public Power District
P.O. Box 98
Brownville, NE 68321

SUBJECT: COOPER NUCLEAR STATION - ISSUANCE OF AMENDMENT RE: REVISED PRESSURE VESSEL FLUENCE AND PRESSURE TEMPERATURE CURVE APPLICABILITY TO 30 EFFECTIVE FULL-POWER YEARS OF OPERATION (TAC NO. MC8728)

Dear Mr. Edington:

The Commission has issued the enclosed Amendment No. 219 to Facility Operating License No. DPR-46 for the Cooper Nuclear Station. The amendment consists of changes to the Technical Specifications in response to your application dated October 12, 2005.

The amendment would extend the range of applicability of the current pressure-temperature limit curves to the end of the current license or for 30 effective full-power years of operation.

A copy of our related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

Brian Benney, Project Manager
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-298

Enclosures:
1. Amendment No. 219 to DPR-46
2. Safety Evaluation

cc w/encls: See next page

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NEBRASKA PUBLIC POWER DISTRICT

DOCKET NO. 50-298

COOPER NUCLEAR STATION

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 219
License No. DPR-46

1. The Nuclear Regulatory Commission (the Commission) has found that:

    A. The application for amendment by Nebraska Public Power District (the licensee) dated October 12, 2005, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

    B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

    C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

    D. The issuance of this license amendment will not be inimical to the common defense and security or to the health and safety of the public; and

    E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and Paragraph 2.C.(2) of Facility Operating License No. DPR-46 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendix A, as revised through Amendment No. 219, are hereby incorporated in the license. The Nebraska Public Power District shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance and shall be implemented within 60 days from the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

David Terao, Chief
Plant Licensing Branch IV
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: April 27, 2006

ATTACHMENT TO LICENSE AMENDMENT NO. 219

FACILITY OPERATING LICENSE NO. DPR-46

DOCKET NO. 50-298

Replace the following pages of the Appendix A Technical Specifications with the enclosed revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

REMOVE	INSERT
3.4-23	3.4-23
3.4-24	3.4-24
3.4-25	3.4-25

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 219 TO

FACILITY OPERATING LICENSE NO. DPR-46

NEBRASKA PUBLIC POWER DISTRICT

COOPER NUCLEAR STATION

DOCKET NO. 50-298

1.0 INTRODUCTION

By letter dated October 12, 2005 (Agencywide Documents Access and Management System Accession No. ML052910034), the Nebraska Public Power District (NPPD), the licensee for the Cooper Nuclear Station (CNS), submitted information and requested to extend the range of applicability of the current pressure-temperature (PT) limit curves to the end of the current license or for 30 effective full-power years (EFPYs) of operation.

The current PT limit curves were developed in the early 90's using a vessel fluence calculation code and method not approved by the Nuclear Regulatory Commission (NRC) staff. In March 2001, the NRC staff issued Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," which instructs the licensees to use an approved methodology for the calculation of the vessel fluence. For several plants, the fluence recalculation effort was delayed until the Radiation Analysis Modeling Application (RAMA) code was approved by the NRC. CNS is one of those plants, and in April 2004, they proposed (and the NRC staff approved) an interim applicability period for the PT limit curves to the End of Cycle 23. The basis of that approval was that the fluence estimate at that time was more than 30 percent lower than the estimated value, thereby, compensating for any uncertainties.

This request is based on a revised fluence calculation using the RAMA code that has been approved by the NRC staff, and also adheres to the guidance in RG 1.190. The recalculated peak vessel fluence value is slightly higher than the previously used value for the estimation of the PT limit curves. Therefore, the licensee is requesting to adjust the period of applicability of the current PT limit curves to 30 EFPYs (in place of the 32) and maintain the same PT limit curves.

2.0 REGULATORY EVALUATION

This review is based on the guidance in RG 1.190 and the fact that the RAMA code has been reviewed and approved by the NRC staff. The RG 1.190 guidance is based on the requirements of General Design Criteria (GDC) 14, 30 and 31. GDC 14, "Reactor coolant pressure boundary," requires that the reactor coolant pressure boundary be designed, fabricated, erected, and tested so as to have an extremely low probability of rapidly propagating rupture. GDC 30, "Quality of reactor coolant pressure boundary," requires, in part, that the reactor coolant pressure boundary be designed, fabricated, erected, and tested to the highest quality standards practical. GDC 31, "Fracture prevention of the reactor coolant pressure boundary," requires, in part, that the reactor coolant pressure boundary be designed with sufficient margin to assure that when stressed under operating, maintenance, testing, and postulated accident conditions it behaves in a non-brittle manner.

3.0 TECHNICAL EVALUATION

3.1 RAMA Calculations

The calculations performed using the RAMA code adhere to the guidance prescribed in RG 1.190. The nuclear data is based on the ENDF/B-VI data file and the BUGLE-96 nuclear data library. The inelastic scattering cross section approximation is P_7 for all nuclides (except actinide and zirconium for which P_5 is used) and the quadrature approximation is S_8. Source values were derived from pin power distribution for Cycles 15 through 21 and estimated power levels for Cycles 1 through 14, for which detailed values were not available. This is acceptable because the total neutron source (neutron leakage) is a function of total energy generated while average power distribution is stable (assuming equilibrium core loadings). Source representation accounted for reactor down time and reduced power operation.

An eighth-core symmetry was analyzed. The core (in its planar view) is quarter-symmetric, but it becomes eighth-symmetric with the addition of a dummy assembly. The axial model depicted the jet pumps as well as the surveillance capsules. The RAMA code produces a three-dimensional flux distribution and the associated spectra in the locations of interest such as vessel welds and surveillance capsules. Details of the calculations are described in the TransWare Enterprises report EPR-VIP-003-R-002, "Cooper Nuclear Station Reactor Pressure Vessel Fluence Evaluation," by TransWare Enterprises Incorporated, April 2005.

3.2 RAMA Benchmarking

The RAMA code was approved by the NRC staff on April 7, 2005. The approval, in part, is subject to the following limitation:

> "To apply the RAMA methodology to plant groups of dissimilar geometry to BWR [Boiling-Water Reactor]-IVs, EPRI [Electric Power Research Institute] must provide at least one plant specific capsule dosimetry analysis to quantify the potential presence of a bias and assure that the uncertainty is within the RG 1.190 limits . . . "

The CNS is a BWR-4 and need not provide a plant-specific surveillance capsule calculation to confirm RAMA's suitability for the task. Regardless, the licensee submitted the analysis of the first dosimetry surveillance capsule (removed at the End of Cycle 9 after 6.8 EFPYs) and the second capsule (removed at the End of Cycle 14 after 11.2 EFPYs). Comparison of the calculated-to-measured ratios (C/M) specific activity values indicate good agreement of all dosimeters except for Nickel in the second capsule that are outside the RG 1.190 limits. However, the mean value is well within the limits and is acceptable.

In addition, the submittal lists the results of 27 other plant-specific BWR-4 surveillance capsule measurements for which the C/M values are well within the RG 1.190 limits. Finally, the submittal reports that comparison to the BWR numerical benchmarks, the H.B. Robinson dosimetry standard, and numerous BWR-2 results are within the required limits.

3.3 RAMA Analytic Uncertainty

RG 1.190 requires for the methodology to establish an analytic uncertainty, which when combined with the measured data uncertainty yields the total uncertainty and possible bias. The reported combined uncertainty is well within the required limits and there is no measurable bias.

3.4 Calculated Vessel Neutron Fluence

The RAMA code is qualified to calculate the CNS neutron field. The submittal lists the results of peak fluence for E > 1.0 million electron volts (MeV), for 32 EFPYs on the vessel shells and for the same conditions on the peak weld fluence. The values of relevance in this evaluation are the peak vessel shell # 2 value of 1.67×10^{18} n/cm^2 at the inside radius and 1.22×10^{18} n/cm^2 for the circumferential shell 1-2 weld (VCB-BA-2), both for 32 EFPYs. Both values are acceptable, because the methodology has been approved and the application conforms to the guidance in RG 1.190.

3.5 PT Limit Adjustment

The peak vessel fluence used for the current PT limit curves is 1.57×10^{18} n/cm^2 compared to 1.67×10^{18} n/cm^2 for the recalculated value. The licensee chose to adjust the period of validity of the current limits rather than to recalculate the PT limits at this time. The adjusted period of validity is inversely proportional to the value of the fluence. Therefore, the proposed value is 30 EFPYs [(1.57/1.67)x32 = 30.08]. The 30 EFPYs value is acceptable because it is slightly conservative and, therefore, the fluence is acceptable.

3.6 Technical Specification Changes

Because the PT limit curves remain the same, the only required changes are in the notation of technical specification Figures 3.4.9-1, 3.4.9-2, and 3.4.9-3 to indicate the new period of validity for 30 EFPYs in place of "End of Cycle 23." This is done correctly.

3.7 Conclusion

The NRC staff reviewed the proposed reevaluation of the vessel fluence methodology and its application to the CNS for 30 EFPYs. The method adheres to the guidance in RG 1.190 and, thus, it is acceptable. In addition, the calculation was carried out in compliance with the same guidance regarding cross sections, geometrical representation, material distribution, etc. Therefore, the proposed fluence values are acceptable. Finally, the licensee correctly represented the proposed changes to the plant technical specifications. The NRC staff finds the proposed changes acceptable.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Nebraska State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment relates to changes in recordkeeping, reporting, or administrative procedures or requirements. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (71 FR 150; January 3, 2006). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: L. Lois

Date: April 27, 2006

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