

February 28, 2002

Mr. R. T. Ridenoure  
Division Manager - Nuclear Operations  
Omaha Public Power District  
Fort Calhoun Station FC-2-4 Adm.  
Post Office Box 550  
Fort Calhoun, NE 68023-0550

SUBJECT: FORT CALHOUN STATION - EXEMPTION FROM THE REQUIREMENTS OF  
APPENDIX G TO 10 CFR PART 50 (TAC NO. MB3606)

Dear Mr. Ridenoure:

The Commission has granted the enclosed exemption from specific requirements of 10 CFR Part 50, Appendix G, for the Fort Calhoun Station (FCS). This action is in response to your letter of December 14, 2001, that submitted a request for exemption from the requirements of 10 CFR Part 50, Appendix G, to allow the use of American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, Code Case N-640, "Alternative Reference Fracture Toughness for Development of P-T Limit Curves for ASME Section XI, Division 1," for FCS. This exemption would support Omaha Public Power District's application for a license amendment dated December 14, 2001, to revise the pressure-temperature (P-T) limits for the operating period of 40 effective full power years (EFPY) in the technical specifications. The licensee developed the new P-T limits using the methodologies in ASME Code Case N-640, instead of the methodologies in 10 CFR Part 50, Appendix G.

We are handling your December 14, 2001, request for a license amendment concurrently with this exemption request, but as a separate action.

A copy of the exemption is enclosed. The exemption has been forwarded to the Office of the Federal Register for publication.

Sincerely,

**/RA/**

Alan B. Wang, Project Manager, Section 2  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-285

Enclosure: Exemption

cc w/encls: See next page

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Ft. Calhoun Station, Unit 1

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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
OMAHA PUBLIC POWER DISTRICT  
FORT CALHOUN STATION  
DOCKET NO. 50-285  
EXEMPTION

1.0 BACKGROUND

The Omaha Public Power District (OPPD/the licensee) is the holder of Facility Operating License No. DPR-40 which authorizes operation of the Fort Calhoun Station. The license provides, among other things, that the facility is subject to all rules, regulations, and orders of the U.S. Nuclear Regulatory Commission (NRC, the Commission) now or hereafter in effect.

The facility consists of a pressurized-water reactor located in Washington County, Nebraska.

2.0 PURPOSE

Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix G, requires that pressure-temperature (P-T) limits be established for reactor pressure vessels (RPVs) during normal operating and hydrostatic or leak-rate testing conditions. Specifically, 10 CFR Part 50, Appendix G, states that, "The appropriate requirements on both the pressure-temperature limits and the minimum permissible temperature must be met for all conditions." In addition, 10 CFR Part 50, Appendix G, specifies that the requirements for these limits "must be at least as

conservative as the limits obtained by following the methods of analysis and the margins of safety of Appendix G of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code)." The approved methods of analysis in Appendix G of Section XI require the use of  $K_{Ia}$  fracture toughness curve in the determination of the P-T limits.

By letter dated December 14, 2001, OPPD submitted a license amendment request to update the P-T limit curves for the Fort Calhoun Station. By letter dated December 14, 2001, OPPD requested NRC approval for an exemption to use Code Case N-640 as an alternative method for complying with the fracture toughness requirements in 10 CFR Part 50, Appendix G, for generating the P-T limit curves. Requests for such exemptions may be submitted pursuant to 10 CFR 50.60(b), which allows licensees to use alternatives to the requirements of 10 CFR Part 50, Appendices G and H, if the Commission grants an exemption pursuant to 10 CFR 50.12 to use the alternatives.

Code Case N-640 (formerly Code Case N-626)

Code Case N-640 permits application of the lower bound static initiation fracture toughness value equation ( $K_{Ic}$  equation) as the basis for establishing the curves in lieu of using the lower bound crack arrest fracture toughness value equation (i.e., the  $K_{Ia}$  equation, which is based on conditions needed to arrest a dynamically propagating crack, and which is the method invoked by Appendix G to Section XI of the ASME Code). Use of the  $K_{Ic}$  equation in determining the lower bound fracture toughness in the development of the P-T operating limits curve is more technically correct than the use of the  $K_{Ia}$  equation since the rate of loading during a heatup or cooldown is slow and is more representative of a static condition than a dynamic condition. The  $K_{Ic}$  equation appropriately implements the use of the static initiation fracture toughness behavior to evaluate the controlled heatup and cooldown process of a reactor vessel. However, since use of Code Case N-640 constitutes an alternative to the

requirements of Appendix G, licensees need staff approval to apply the code case methods to the P-T limit calculations.

### 3.0 DISCUSSION

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50, when (1) the exemptions are authorized by law, will not present an undue risk to public health or safety, and are consistent with the common defense and security; and (2) when special circumstances are present. Special circumstances are present whenever, according to 10 CFR 50.12(a)(2)(ii), "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

#### Code Case N-640 (formerly Code Case N-626)

OPPD has requested, pursuant to 10 CFR 50.60(b), an exemption to use ASME Code Case N-640 (previously designated as Code Case N-626) as the basis for establishing the P-T limit curves. Appendix G to 10 CFR Part 50 has required use of the initial conservatism of the  $K_{Ia}$  equation since 1974 when the equation was codified. This initial conservatism was necessary due to the limited knowledge of RPV materials. Since 1974, the industry has gained additional knowledge about RPV materials, which demonstrates that the lower bound on fracture toughness provided by the  $K_{Ic}$  equation is well beyond the margin of safety required to protect the public health and safety from potential RPV failure. In addition, the RPV P-T operating window is defined by the P-T operating and test limit curves developed in accordance with the ASME Code, Section XI, Appendix G, procedure.

The ASME Working Group on Operating Plant Criteria (WGOPC) has concluded that application of Code Case N-640 to plant P-T limits is still sufficient to ensure the structural

integrity of RPVs during plant operations. The staff has concurred with ASME's determination. The staff has concluded that application of Code Case N-640 would not significantly reduce the safety margins required by 10 CFR Part 50, Appendix G. The staff had concluded that application of Code Case N-640 would provide that adequate safety margins are maintained such that the underlying purpose of 10 CFR Part 50, Appendix G is met, pursuant to 10 CFR 50.12(a)(2)(ii), for the Fort Calhoun Station RPV and reactor coolant pressure boundary (RCPB). Therefore, the staff concludes that Code Case N-640 is acceptable for application to the Fort Calhoun Station P-T limits.

The staff has determined that OPPD has provided sufficient technical bases for using the methods of Code Case N-640 for the calculation of the P-T limits for the Fort Calhoun Station RCPB. The staff has also determined that application of Code Case N-640 to the P-T limit calculations will continue to serve the purpose in 10 CFR Part 50, Appendix G, for protecting the structural integrity of the Fort Calhoun RPV and RCPB. In this case, since strict compliance with the requirements of 10 CFR Part 50, Appendix G, is not necessary to serve the underlying purpose of the regulation, the staff concludes that application of Code Case N-640 to the P-T limit calculations meets the special circumstances provision stated in 10 CFR 50.12(a)(2)(ii), for granting this exemption to the regulation.

#### 4.0 CONCLUSION

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12(a), the exemption is authorized by law, will not endanger life or property or common defense and security, and is, otherwise, in the public interest. Also, special circumstances are present. Therefore, the Commission hereby grants Omaha Public Power District an exemption from the requirements of 10 CFR Part 50, Appendix G, for the Fort Calhoun Station.

Pursuant to 10 CFR 51.32, the Commission has determined that the granting of this exemption will not have a significant effect on the quality of the human environment (67 FR 9008).

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 28<sup>th</sup> day of February 2002.

FOR THE NUCLEAR REGULATORY COMMISSION

*/RA/*

John A. Zwolinski, Director  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation