your energy partner®
OPPD
Omaha Public Power District

444 South 16th Street Mall
Omaha NE 68102-2247

December 14, 2001
LIC-01-0122

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

References:
1. Docket No. 50-285
2. Letter from OPPD (W. G. Gates) to NRC (Document Control Desk), "Fort Calhoun Station Unit No. 1 License Amendment Request, Pressure and Temperature (P-T) Limit Curve for 40 Effective Full Power Years (EFPY)," dated December 14, 2001 (LIC-01-0114)

SUBJECT: Fort Calhoun Station Unit No. 1 Exemption Request, "10 CFR Part 50, Appendix G, Requirements"

Pursuant to the requirements of 10 CFR 50.12(a), Fort Calhoun Station (FCS) requests an exemption from certain requirements of 10 CFR Part 50, Appendix G, to use American Society of Mechanical Engineers (ASME) Code Case N-640 to support an in-progress license amendment request revising the FCS Technical Specification pressure/temperature (P-T) curves (Reference 2). Specifically, Paragraph (IV)(A)(2)(b) of 10 CFR Part 50, Appendix G, states: "The pressure-temperature limits . . . must be at least as conservative as limits obtained by following the methods of analysis and the margins of safety of Appendix G of Section XI of the ASME Code." Pressure/temperature limits obtained using Code Case N-640 do not meet the requirements set forth in this paragraph.

FCS's evaluation, attached, provides OPPD's basis for the exemption request which would allow application of Code Case N-640. Code Case N-640 permits use of K_{IC}, fracture toughness curve shown on ASME XI, Appendix A, Figure A-2200-1, in lieu of the K_{IA}, fracture toughness curve from ASME XI, Appendix G, Figure G-2210-1, as the lower bound for fracture toughness. The exemption request involves only a change of the fracture toughness curve used for development of the P-T curves from K_{IA} to K_{IC}. The other margins involved with the ASME XI, Appendix G, process of determining P-T limit curves remain unchanged.

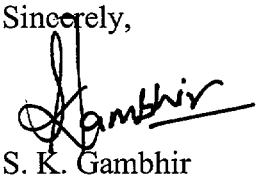
FCS believes that the exemption requirements of 10 CFR 50.12 are satisfied. Special circumstances are present, as described in 10 CFR 50.12(a)(2)(ii) and (iii), to warrant granting the exemption. The exemption is requested for the life of the plant or until such time as Code Case N-640 is incorporated into the ASME code and the NRC generically approves use of this version of the code, including incorporation into 10 CFR 50 Appendix G.

A047

OPPD desires to make use of the proposed heatup and cooldown rates for the upcoming spring 2002 refueling outage. In order to allow time to make the necessary preparation to use the new heatup and cooldown rates, OPPD requests that the Nuclear Regulatory Commission review and approve this exemption request and Reference (2) on or before March 15, 2002.

Should you have questions regarding this matter, pleased contact Dr. Richard Jaworski at (402)-533-6833.

Sincerely,



S. K. Gambhir
Division Manager
Nuclear Operations

SKG/RLJ/rlj

Attachment

c: E. W. Merschoff, NRC Regional Administrator, Region IV
A. B. Wang, NRC Project Manager
W. C. Walker, NRC Senior Resident Inspector
Winston & Strawn

Fort Calhoun Station's Evaluation
10 CFR Part 50, Appendix G, Requirements

Pursuant to the requirements of 10 CFR 50.12(a), Fort Calhoun Station (FCS) requests an exemption from certain requirements of 10 CFR Part 50, Appendix G, to use American Society of Mechanical Engineers (ASME) Code Case N-640 to support an in-progress license amendment request revising the FCS Technical Specification pressure/temperature (P-T) curves (Reference 2). Specifically, Paragraph (IV)(A)(2)(b) of 10 CFR Part 50, Appendix G, states: "The pressure-temperature limits . . . must be at least as conservative as limits obtained by following the methods of analysis and the margins of safety of Appendix G of Section XI of the ASME Code." Pressure/temperature limits obtained using Code Case N-640 do not meet the requirements set forth in this paragraph.

FCS believes that the exemption requirements of 10 CFR 50.12 are satisfied. Special circumstances are present, as described in 10 CFR 50.12(a)(2)(ii) and (iii), to warrant granting the exemption. The exemption is requested for the life of the plant or until such time as Code Case N-640 is incorporated into the ASME code and the NRC generically approves use of this version of the code, including incorporation into 10 CFR 50 Appendix G.

THE REQUIREMENTS OF 10 CFR 50.12 ARE MET

The standards set forth in 10 CFR 50.12 provide that specific exemptions may be granted that:

- are authorized by law;
- will not present an undue risk to the public health and safety;
- are consistent with the common defense and security; and
- are accompanied by special circumstances.

The standards for the exemption are satisfied, as described below.

I. The Requested Exemption is Authorized by Law

No law exists that precludes the activities covered by this exemption request. 10 CFR 50.60(b) allows the use of alternatives to 10 CFR Part 50, Appendices G and H, when an exemption is granted by the Commission under 10 CFR 50.12.

II. The Requested Exemption Does Not Present an Undue Risk to the Public Health and Safety

Code Case N-640 permits use of K_{IC}, fracture toughness curve shown on ASME XI, Appendix A, Figure A-2200-1, in lieu of the K_{IA}, fracture toughness curve from ASME XI, Appendix G, Figure G-2210-1, as the lower bound for fracture toughness. The exemption

request involves only a change of the fracture toughness curve used for development of the P-T curves from K_{IA} to K_{IC}. The other margins involved with the ASME XI, Appendix G, process of determining P-T limit curves remain unchanged.

Use of the K_{IC} curve in determining the lower bound fracture toughness in the development of a P-T operating limits curve is more technically correct than the K_{IA} curve. The K_{IC} curve appropriately implements the use of static initiation fracture toughness behavior to evaluate the controlled heatup and cooldown process of a reactor vessel. The use of the initial conservatism of the K_{IA} curve when the curve was codified in 1974 was necessary due to the limited knowledge of reactor pressure vessel materials. Since 1974, additional knowledge has been gained about reactor pressure vessel materials, which demonstrates that the lower bound on fracture toughness provided by the K_{IA} curve is well beyond the margin of safety required to protect the public health and safety from potential reactor pressure vessel failure. In addition, P-T curves based on the K_{IC} curve will enhance overall plant safety by opening the P-T operating window with the greatest safety benefit in the region of low temperature operations. The existing FCS restrictive cooldown rates in low temperature regions impact the integrity of plant components due to corrosion, plant work-arounds, and critical path time.

III. The Requested Exemption Will Not Endanger the Common Defense and Security

FCS believes the requested exemption is consistent with the common defense and security.

IV. Special Circumstances

The following special circumstances from 10 CFR 50.12(a)(2) are present:

(ii) Application of the regulation in this particular circumstance is not necessary to achieve the underlying purpose of the rule.

As described above, the existing approach for determining the P-T limits was conservatively developed based on the level of knowledge existing in 1974. Since 1974, the level of knowledge in this area has been greatly expanded. This increased knowledge permits relaxation of the current ASME XI, Appendix G, requirements as provided by ASME Code Case N-640, while maintaining the underlying purpose of the ASME Code and the NRC regulations to ensure an acceptable margin of safety.

(iii) Compliance would result in undue hardships or costs that are significantly in excess of those contemplated when the regulation was adopted.

During startup from a refueling or cold shutdown outage, Fort Calhoun Station (FCS) must undergo significant hardships due to the present lower cooldown rates that are required as a result of 10 CFR 50 Appendix G (and the use of K_{IA}). These hardships were a result of the current 24.25 EFPY pressure and temperature limit curves, which mandate a cooldown rate of 10°F/hr below 135°F as implemented by Technical Specification (TS) Amendment 161. Pursuant to this, FCS submitted License Event Report (LER) 96-014, which dealt with violating the TS cooldown rate of 10°F/hr when starting the first reactor coolant pump (RCP) during a heatup mode. As a result of this LER, FCS implemented the following:

1) Procedurally raised the minimum temperature to start the first RCP to 155°F;
2) Established a procedure to drain and refill the steam generators (S/Gs) prior to starting the first RCP to minimize the temperature differential between them and the RCS to minimize the associated cooldown;
3) Conducted measurements of S/G shell side temperatures using temporary external local instrumentation.

As a result of increasing the minimum reactor coolant system temperature for the first RCP start, at least thirteen hours is scheduled in an outage to attain this temperature due to the lack of heat sources. During this heatup, the S/Gs must be drained. This requires the control room operators to be focused on multiple evolutions at the same time. Additionally, the S/Gs are unnecessarily drained for up to 8 hours during preparations to start the first RCP, which leads to an increased corrosion rate of the S/Gs during the uncovered period. Once the RCPs are started, control room operators must focus on controlling the associated heatup rate with filling the S/Gs to normal indicated levels. Other benefits of the proposed change are: 1) the S/Gs are available as heat sinks for decay heat removal because they would not be drained prior to starting the first RCP, and 2) operators would no longer need to enter containment to verify S/G temperatures, hence avoiding additional radiation dose in support of FCS's "As Low As Reasonably Achievable" (ALARA) goals.

Therefore, due to the administrative requirements of 10 CFR 50 Appendix G (using K_{IA}), an unnecessary burden is placed on operation of the reactor plant and plant operators. Use of ASME Code Case N-640 (and the use of K_{IC}) in the proposed changes described in the reference below alleviates the problems stated above by: 1) minimizing the number of concurrent plant controlling evolutions; 2) minimizing the potential of challenging TS cooldown limits (based on the use of K_{IA} versus K_{IC}); 3) maximizing the life of FCS's S/Gs by reducing the corrosion rate associated with extended periods of dryout from draining; and 4) providing an additional heat sink for decay heat removal.

CONCLUSION

The specified requirements of 10 CFR Part 50, Appendix G, would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. American Society of Mechanical Engineers Section XI, Appendix G, requirements were conservatively developed based on the level of knowledge existing in 1974 concerning reactor pressure vessel materials and the estimated effects of operation. Since 1974, the level of knowledge about these topics has been greatly expanded. OPPD believes this increased knowledge permits relaxation of the ASME Section XI, Appendix G, requirements by application of ASME Code Case N-640, while maintaining, pursuant to 10 CFR 50.12(a)(2)(ii), the underlying purpose of the ASME Code and the NRC regulations to ensure an acceptable margin of safety. Therefore, this exemption does not present an undue risk to the public health and safety.

Reference:

Letter from OPPD (W. G. Gates) to NRC (Document Control Desk), "Fort Calhoun Station Unit No. 1 License Amendment Request, "Pressure and Temperature (P-T) Limit Curve for 40 Effective Full Power Years (EFPY)," dated December 14, 2001 (LIC-01-0114)