UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
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April 5, 2004

NRC REGULATORY ISSUE SUMMARY 2004-04: USE OF CODE CASES N-588, N-640, AND N-641 IN DEVELOPING PRESSURE-TEMPERATURE OPERATING LIMITS

ADDRESSEES

All holders of construction permits or operating licenses for nuclear power reactors except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.

INTENT

The U.S. Nuclear Regulatory Commission (NRC) is issuing this regulatory issue summary (RIS) to inform addressees of the NRC position on the use of American Society of Mechanical Engineers (ASME) Code Cases N-588, N-640, and N-641 in developing reactor pressure vessel pressure-temperature limits using ASME Section XI, Appendix G. This RIS does not require any action or written response on the part of an addressee.

BACKGROUND

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. Further, Appendix G of 10 CFR Part 50 specifies that the requirements for these limits are based on the application of evaluation procedures given in Appendix G to Section XI of the American Society of Mechanical Engineers (ASME) Boiler & Pressure Vessel Code (Code).

Since ASME Section XI, Appendix G, was first developed, significant advances in fracture mechanics and the analysis of reactor vessel integrity have been achieved. In general, advancements in knowledge are promulgated as ASME Code Cases, for example, Code Cases N-588, N-640, and N-641, which provide alternatives to existing Code requirements for developing pressure-temperature operating limits. These alternatives to the Appendix G methodology have been proposed and accepted as appropriate alternatives and are documented in Regulatory Guide 1.147, “Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1.” The provisions of ASME Code Cases N-588, N 640, and N-641 that are applicable to P-T limit curve development were incorporated into ASME Code Section XI, Appendix G in the 1998 edition through 2000 addenda which is the edition and addenda codified in 10 CFR 50.55a, effective October 28, 2002 (67 FR 60520).

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Code Case N-588 provides an alternative procedure for assuming axially oriented reference defects in all axial welds and base metal and circumferentially oriented reference defects in all circumferential welds. Code Case N-640 allows the use of K_{IC} (which is the material toughness property measured in terms of stress intensity factor, K_i, which will lead to nonductile crack propagation) instead of K_{IA} (which is the critical value of the stress intensity factor, K_I, for crack arrest as a function of temperature) in the development of pressure-temperature limit curves. Code Case N-641 presents alternative procedures for calculating pressure-temperature relationships and low-temperature overpressure protection (LTOP) system effective temperatures and allowable pressures. These procedures take into account alternative fracture toughness properties, circumferential and axial reference flaws, and plant-specific LTOP enable temperature calculations.

SUMMARY OF ISSUE

Historically, the NRC staff has taken the position that licensees are only permitted to use editions and addenda of Appendix G to Section XI of the ASME Code incorporated into a facility's licensing basis (i.e., through their defined facility inservice inspection program) for the purpose of meeting the requirements for Appendix G to 10 CFR Part 50. For an example, if a licensee wished to use a less conservative methodology based on the use of an ASME Code Case in order to relax requirements for RPV P-T limit curve development, the licensee needed to obtain an exemption from the requirements of Appendix G to 10 CFR Part 50.

Recently, the NRC re-evaluated the relationship between 10 CFR part 50 appendix G and 10 CFR 50.55a. In summary:

- Licensees may use the provisions of any edition and addenda of ASME Code Section XI, Appendix G incorporated into 10 CFR 50.55a for RPV P-T limit curve development, up to and including the most recently incorporated edition and addenda, without the need for an exemption.

- Use of NRC approved ASME Code Cases (e.g., N-588, N-640, and N-641) in conjunction with earlier versions of the ASME Code endorsed in 10 CFR 50.55a may also be used for the development of P-T limit curves without the need for an exemption.

- However, changing the P-T limit curve methodology specified in the licensee's Technical Specifications or modifying a facility's pressure-temperature limit report (PTLR) methodology requires NRC staff approval since this is a license amendment.

BACKFIT DISCUSSION

This RIS does not require any action or written response and, therefore, is not a backfit under 10 CFR 50.109. Consequently, the staff did not perform a backfit analysis.

SMALL BUSINESS REGULATORY ENFORCEMENT FAIRNESS ACT

The NRC has determined that this action is not subject to the Small Business Regulatory Enforcement Fairness Act of 1996.

FEDERAL REGISTER NOTIFICATION

A notice of opportunity for public comment on this RIS was not published in the Federal Register because the RIS is informational.

PAPERWORK REDUCTION ACT STATEMENT

This RIS does not contain information collections and, therefore, is not subject to the requirements of Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.).

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, an information collection unless the requesting document displays a currently valid OMB control number.

If you have any questions about this matter, please contact the person listed below or the appropriate Office of Nuclear Regulatory Regulation (NRR) project manager for a specific vendor or industry group as listed on the NRC Web site.

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Attachment: List of Recently Issued Regulatory Issue Summaries

LIST OF RECENTLY ISSUED
NRC REGULATORY ISSUE SUMMARIES

Regulatory Issue Summary No.	Subject	Date of Issuance	Issued to
2004-03	Risk-informed Approach For Post-Fire Safe-Shutdown Associated Circuit Inspections	03/02/2004	All holders of operating licenses for nuclear power reactors, except those who have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.
2004-02	Deferral of Active Regulation of Ground-Water Protection at *in Situ* Leach Uranium Extraction Facilities	02/23/2004	All holders of materials licenses for uranium and thorium recovery facilities.
2004-01	Method for Estimating Effective Dose Equivalent from External Radiation Sources Using Two Dosimeters	02/17/2004	All U.S. Nuclear Regulatory Commission (NRC) licensees.
2003-18	Use of NEI 99-01," Methodology for Development of Emergency Action Levels," Revision 4, Dated January 2003	10/08/2003	All holders of operating licenses for nuclear power reactors and licensees that have permanently ceased operations and have certified that fuel has been permanently removed from the reactor vessel.
2003-17	Complying with 10 CFR 35.59, "Recentness of Training," for Board-certified Individuals Whose Training and Experience Were Completed More than 7 Years Ago	10/03/2003	All U.S. Nuclear Regulatory Commission (NRC) medical-use licensees and NRC master materials license medical-use permittees.

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CP = Construction Permit