

NOV 12 1982

TO ALL POWER REACTOR LICENSEES (EXCEPT FT. ST. VRAIN)

Gentlemen:

SUBJECT: NUREG-0744 REV. 1; (GENERIC LETTER NO. 82-26) -
PRESSURE VESSEL MATERIAL FRACTURE TOUGHNESS

Appendix G to 10 CFR 50 specifies fracture toughness requirements for pressure retaining components, fabricated from ferritic materials, in the reactor coolant pressure boundary of water cooled reactors. In the event a pressure retaining component fails to meet the material toughness requirements during its service life due to neutron radiation embrittlement, continued operation of the component is permissible provided certain requirements, specified in Section V.C of Appendix G, are satisfied.

One of the requirements of Section V.C is that a fracture analysis of the component is to be performed to demonstrate the existence of adequate margin for continued operation. The proposed program for satisfying this requirement is to be submitted to the USNRC for review and approval at least 3 years prior to the date fracture toughness levels are predicted to no longer satisfy requirements.

Appendix H to 10 CFR 50 specifies the surveillance program which all power reactor licensees must maintain to monitor irradiation-induced fracture toughness changes. Impact data from this program are used to adjust the reference toughness curve for irradiation effects through the application of the adjusted reference temperature. The Charpy V-notch 50 ft-lb level is used to determine the temperature shift; therefore, when the upper shelf energy falls below 50 ft-lb, the requirements of 10 CFR 50 Appendix G are no longer met.

To provide guidance to licensees who may be required to submit a fracture analysis to justify continued operation of a pressure vessel, the USNRC has developed an elastic-plastic fracture mechanics analytical procedure. This analytical methodology is presented in NUREG-0744, Revision 1 (Office of Management and Budget Clearance Number 3150-0011), a copy of which is enclosed with this letter.

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This document presents one methodology which is acceptable to the USNRC staff for meeting the requirement for a fracture analysis with sufficient accuracy and reliability to demonstrate adequate margins for continued operation in accordance with Section V.C.3 of Appendix G to 10 CFR 50. Licensees, however, need not employ this specific fracture analysis methodology and may submit an analysis based on other techniques for NRC review and approval.

Available evidence reveals that the upper shelf energy of a number of power reactor pressure vessels may fall below the 50 ft-lb level before the end of their design life unless measures such as revised fuel management schemes are instituted. It is likely that several licensees may elect to submit fracture analysis to support continued operation. All licensees are encouraged to review NUREG-0744, Revision 1 and consider its application in those cases where it may be necessary to submit a fracture analysis to the NRC for review and approval.

Sincerely,

Original signed by
Darrell G. Eisenhut

Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation

Enclosure: *See Jacket*
NUREG-0744, Rev. 1

Service List: *See Jacket*
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