



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

AUG 11 1992

Ms. Cynthia L. Tully, Chairman
BWR Owners' Group
Southern Nuclear Operating Company
P.O. Box 1295, Bin 8052
Birmingham, Alabama 35201

Dear Ms. Tully:

SUBJECT: BWR BELTLINE MATERIAL UPPER SHELF ENERGY ESTIMATION METHODS

In your letter of June 12, 1992, you requested that the NRC review and approve for generic applications by BWR plants the GE Report GE-NE-523-18-1191, "BWR Beltline Material Upper Shelf Energy Estimation Methods." We have screened the responses of all BWR licensees in relation to the information requested in Generic Letter 92-01 on Charpy upper shelf energy (USE). Twenty three (23) plants may need to supplement their responses by using the BWR estimation method. In addition, 10 other plants have provided a limited amount of information and may also need to use the BWR estimation method. As a large number of BWR's (33 out of 37) could utilize the report, we believe a generic method is needed.

The staff benchmarked the plate material formulas that contain both percent shear and transition energy using data from Fermi-2, Hatch-2, Oyster Creek and Nine Mile Point-1. The staff used limiting values of percent shear (70 percent for 10°F and 90 percent for 40°F) for Oyster Creek and Nine Mile Point 1 plate materials since they did not have recorded values for percent shear. The measured amounts of USE were less than the predicted USE (nonconservative) for the limiting plates in Nine Mile Point 1 and Hatch 2. The measured amounts of USE were greater than the predicted USE (conservative) for the limiting plates in Fermi-2 and Oyster Creek. The staff is concerned that, based on the benchmarking results, the proposed methodology may be nonconservative.

As a result of the NRC staff review of the GE report, we conclude that:

- a) the plate estimation formula that utilize Charpy transition energy and percent shear may be nonconservative;
- b) for beltline plates that do not report the percent shear, licensees should assume a bounding value of percent shear to determine their unirradiated USE;
- c) the plate and weld estimation formulas that utilize only transition energy are unacceptable because there is no physical basis; and

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- d) the surveillance data estimation method is acceptable provided the material is representative of the beltline material and contains a percentage of copper equal to or greater than the amount of copper in the limiting beltline material.

In lieu of determining the unirradiated USE for welds, the BWROG should review BWR and PWR surveillance data to determine the neutron fluence required to reach 50 ft-lb USE for their welds. Also, instead of using lower bound 95 percent confidence curves for determining the Charpy USE for plates, the BWROG should consider utilizing bounding curves or, alternately, should investigate BWR and PWR surveillance data to determine whether irradiated USE is conservatively estimated using: (a) the 95 percent confidence curves, (b) the 65 percent correction for orientation, and (c) the irradiation effect predicted by Regulatory Guide 1.99, Revision 2.

The NRC would be pleased to provide a summary of upper shelf energy data for welds and plates from PWR and BWR surveillance programs, if the BWROG decides to pursue this investigation.

Sincerely,



James E. Richardson, Director
Division of Engineering Technology
Office of Nuclear Reactor Regulation

cc: K. Cozens, NUMARC

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