



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

December 11, 1990

Docket No. 50-029

Mr. George Papanic, Jr.
Senior Project Engineer - Licensing
Yankee Atomic Electric Company
580 Main Street
Bolton, Massachusetts 01740-1398

Dear Mr. Papanic:

SUBJECT: REVIEW OF PROPOSED YANKEE ROWE TEST REACTOR IRRADIATION PROGRAM

In a letter to Dr. A. C. Kadak dated August 31, 1990, the staff concluded that Yankee Atomic Electric Company should perform tests on typical Yankee Rowe base metal to determine the effect of neutron irradiation, austenitizing temperature (grainsize) and nickel composition on embrittlement at 500°F and 550°F irradiation temperatures. In a letter dated November 26, 1990, you submitted a description of your materials test program for review and approval.

You have identified the test matrix for the first irradiation capsule. The material to be placed in the capsule is similar in residual elements to the Yankee Rowe lower plate. The capsule material would contain 0.24 percent copper, 0.62 percent nickel and 0.008 percent phosphorus. The Yankee Rowe lower plate contains 0.20 percent copper, 0.63 percent nickel and 0.016 percent phosphorus. The residual elements in the capsule material, except for phosphorus, will produce greater irradiation embrittlement than the residual elements in the Yankee Rowe lower plate. Hence, the first irradiation test matrix should produce data that bounds the embrittlement of the Yankee Rowe lower plate. However, the staff is concerned that the amount of phosphorus in the capsule material is less than the amount in the Yankee Rowe lower plate and the neutron flux and spectrum for the test capsule are different than those for the vessel. Prior to utilizing the data from the test program, you should determine the effect of the difference in phosphorus, spectrum and neutron flux on the embrittlement of the capsule material and how it correlates to the Yankee Rowe lower plate.

The test matrix for the first irradiation capsule will produce only one data point representing the Yankee Rowe lower plate (coarse grain material at 500°F irradiation temperature). To produce bounding results, more than one data point is needed. To the extent possible, the staff recommends that you follow ASTM E 185-82.

The staff recommends that the increase in reference temperature for the Yankee Rowe beltline weld metals be estimated using the methodology in Regulatory Guide 1.99, Revision 2 and an increase of 50°F to account for irradiation temperature (500°F vs. 550°F). If you desire to utilize another methodology or a different irradiation temperature adjustment, you will need an irradiation test program for the weld metal.

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In your presentation to the staff on November 20, 1990, you indicated one sample was to be removed from the upper axial weld. The staff indicated that due to variability in the amounts of residual elements in Babcock & Wilcox welds more than one sample will be required. You should provide the staff with a revised sampling plan.

Please contact B. Elliot at 301-492-0709 or P. Sears at 301-492-1436 if you have any questions.

Original signed by
Patrick M. Sears, Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

cc: See next page

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Mr. George Papanic, Jr.

Yankee Rowe

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