YANKEE ATOMIC ELECTRIC COMPANY

Telephone (508) 779-6711
TWX 710-380-7619

580 Main Street, Bolton, Massachusetts 01740-1398

November 14, 1996
BYR 96-052

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Attention: Mr. Cass R. Chappell, Section Chief
Package Certification Section
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards

References: (a) Docket No. 71-9262
(b) USNRC Letter to YAEC, dated February 6, 1996
(c) YAEC Letter to USNRC, dated March 23, 1995

Subject: SAR Revision - Request for Modification to COC

Dear Mr. Chappell,

In Reference (b), the Staff issued a Certificate Of Compliance (COC) for shipment of the YNPS Reactor Pressure Vessel (RPV) Package. The basis for this COC was the Safety Analysis Report (SAR) submitted in Reference (c). For the following reasons, a revision of the SAR is necessary. This letter requests review of these changes and revision of the COC as necessary to permit a range of acceptable concrete densities in the annulus between the RPV and the shipping cask.

In our original submittal [Reference (c)] and as described in the COC [Reference (b)], the RPV package would first travel by motor vehicle from the YNPS site to the rail site at the Hoosac Tunnel in Florida, MA and then subsequently travel by rail to Barnwell, SC for disposal. However, based on our discussions with the various railroads along the route, it is necessary to reduce the weight of the package to gain a certified route to the disposal facility. Pursuant to these discussions, we have reduced the weight of the package approximately 35.5 tons by reducing the density of the fill concrete (grout) between the external surface of the reactor vessel and the steel shipping cask. The concrete density was reduced from 140-150 pcf to an average density of 75-85 pcf. As a result, the shielding, thermal and structural analyses were re-evaluated to determine the overall impact. These analyses demonstrate that the package continues to meet acceptance criteria as defined in 10CFR71. The results of these analyses are described below.

Shielding Analysis

The shielding analysis has been re-evaluated based on a 75 pcf density concrete in the annulus between the RPV and the cask, in place of the originally proposed normal density concrete of 140 pcf. The results of this re-evaluation are presented in revised Table 5.1.1 and demonstrate that the

NTOI
Ltr. Encl 1/3

change: E. Bigsker 4 D

dose rates for the package (calculated as of 1/1/97) remain significantly below the regulatory limits in 10CFR71.47. Calculated dose rates will be confirmed by the package surveys required by 10CFR71.87 (see Chapter 8 of the SAR) prior to shipment of the package from YNPS.

Thermal Analysis

The thermal analysis was re-evaluated to determine the impact of the reduced concrete density in the annulus between the RPV and the cask. This re-evaluation also credited the actual density of the concrete (100 pcf) used to fill the solidified internal waste (dross) canister (a now completed activity). The results of this re-evaluation are presented in revised Tables 3.4.1 and 3.4.2. The reduced density concrete used has the overall impact of lowering the thermal conductivity of the package. The reduction in thermal conductivity increases the theoretical maximum internal package temperature by approximately 6 degrees F, from 187.6 to 193.6 degrees F, and increases the theoretical maximum internal pressure of the package by about 0.2 psi from 19.35 psia to 19.53 psia.

The structural analysis of the shipping cask was redone using these values. The stresses in the cask remain well within allowable limits when subjected to these conditions. The theoretical maximum surface temperature remains unchanged. Based on these results, the RPV package continues to meet the thermal performance requirements of 10CFR71.

Structural Analysis

The shipping cask structural analysis was re-evaluated to determine the direct impact of the lower density concrete in the annulus between the RPV and the cask as well as the impact of the revised thermal analysis. The results of this re-evaluation are shown on revised Table 2.6.3. Since the structural analysis incorporates the weight of the concrete, but takes no credit for its strength, the reduction in weight increases the overall strength-to-weight ratio of the package. The reduced density concrete results in an overall weight reduction in the RPV package from 727,000 lbs to approximately 656,000 lbs. Revision 1 of Yankee calculation YRC-1062 provides the revised structural analysis. Based on the results of this re-evaluation, the original conclusions of Reference (c) are not changed by the use of lower density concrete - maximum stresses are less than the limits of ASME Section VIII and Regulatory Guide 7.6.

Additional Minor Changes

1. Changed Section 2.5 to reflect the final arrangement of clevises used to lift the vessel from containment. These lifting devices are not a structural part of the shipping package.

2. Changed Section 7.5.1 to modify the process to transfer the cask from road hauler to rail car. The fundamentals of this process are unchanged - the package will not be lifted by a crane at any time.

Summary

Revisions to the Safety Analysis Report have been completed and are attached. Calculations that did not change have not been re-produced. These revisions lower the average density of the concrete between the RPV external wall and the steel shipping cask inside surface. An assessment of the impact of the reduced concrete density has been performed and is provided to demonstrate that the impact is acceptable and the results remain well within the acceptable limits of 10CFR71.

Status/Schedule

To date, Yankee has completed removal of the upper neutron shield tank (SAR Section 7.1.1). The main coolant piping was cut and eight spool pieces removed and the nozzle plugs installed (SAR Section 7.1.1). The dross in the bottom of the reactor vessel was consolidated and solidified in the dross canister located in the vessel (SAR Section 7.5.2). The transport route evaluations described in SAR Section 7.4.2 have been performed and a new bridge, designed for this package weight, has been constructed over the Sherman Dam spillway.

The reactor vessel is currently scheduled to be lifted and removed from containment into the shipping cask after November 18, 1996. The package will be subsequently filled with concrete, stored through the winter months, and shipped to Barnwell, SC in the spring of 1997. The State of Massachusetts Highway Department will commence a major road re-construction on River Road starting April 1, 1997. Therefore, the timing of this review is requested to coincide with our objective to ship the package before this deadline.

We believe the changes described herein are simplistic and either inconsequential or actually result in an improvement to the package integrity. If you have any questions or desire additional information, please contact us.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

J. A. Kay
Principal Licensing Engineer

cc: Document Control Desk (1 original + 10 copies)
M. Fairtile, NRR
J. White, NRC - Region I