Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379-2000

March 28, 1997

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Gentlemen:

In the Matter of	)	Docket No. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - RESPONSE TO NRC REQUEST FOR ADDITIONAL INFORMATION REGARDING TECHNICAL SPECIFICATION CHANGE 96-02.

Reference: NRC letter to TVA dated March 21, 1997, "Request for Additional Information - Technical Specification Change Request TS 96-02 for Sequoyah Nuclear Plant Units 1and 2 (TAC Nos. M96592 and M96593).

Enclosed are TVA responses to the NRC questions contained in the referenced letter. Please direct questions concerning this issue to Don Goodin at (423) 843-7734.

Sincerely,

R. H. Shell

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Site Licensing and Industry Affairs Manager

D030 1/1

Enclosure
cc (Enclosure):

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ENCLOSURE

Sequoyah Nuclear Plant

TVA Responses to NRC Questions for TS Change Request 96-02,

Ice Condenser Ice Weight Reduction and Chemical Analysis

Surveillance Interval Extension

Question

1. In tne WCAP-12455, Revision 01 containment integrity analysis, it is indicated that this analysis utilized revised input assumptions which eliminated analytical conservatisms from the present analysis. Please provide the comparison and basis for the difference in assumptions for the following:

   a. Core Stored Energy
   b. Decay Heat Release
   c. Bounding condition for steam generator equilibrium and depressurization to reflect actual plant conditions.

Response

The present (previous) analysis used a core stored energy of 4.81 full power seconds (FPS) which is a bounding value for a full core (193 fuel assemblies) of fresh fuel. The revised (future) analysis used a core stored energy of 3.58 FPS which is bounding for 88 fresh fuel assemblies. The 88 fresh fuel assemblies is a conservative maximum core design limit. Fuel cycle management practices at Sequoyah only require fresh fuel assemblies for approximately one-third (64) of each core reload.

Both the present analysis and the revised analysis used the ANSI/ANS-5.1 1979 Decay Heat Standard (including the two sigma uncertainty). The present analysis used the decay heat generation rate (BTU/BTU) defined in figure 16 of WCAP-10325, "Westinghouse LOCA Mass and Energy Release Model for Containment Design March 1979 Version". As noted in WCAP-10325, Page 2-10, "These values are an upper bound for generic use. Westinghouse retains the option to provide more specific input on a plant by plant basis". The revised analysis used the decay heat generation rate (BTU/BTU) defined in Table 2-2 of WCAP-12455, Revision 01 until steam generator equilibration was reached (i.e., approximately 1697.2 seconds). After this time, the mass and energy release available to containment is generated based upon the upperbound rates defined in WCAP-10325. The revised decay heat curve is based upon Sequoyah plant specific parameters which have decreased the generic decay heat rates on the order of 1 to 3 percent.

The present analysis assumed a bounding condition for steam generator equilibrium and depressurization based upon assumed containment pressures that were lower than the final containment response. This lower containment back pressure assumption increases the rate of release of secondary energies. The revised analysis iterated on the depressurization and equilibrium pressures to ensure that the pressure was close to, but not less than, the final containment response illustrated in Figure 3-1 of WCAP-12455, Revision 01. In the mass and energy release calculations for the FROTH period, the broken loop was assumed to depressurize to 5.3 psig, which occurs at 711.35 seconds, and the unbroken loop to 5.2 psig, which occurs at 1697.19 seconds. The final containment response illustrated in Figure 3-1 of WCAP-12455, Revision 01 demonstrates that the containment pressure is consistent with the assumed depressurization.

Question

2. In the above report, it is indicated that this analysis accounted for the effects of other plant changes that Westinghouse is aware of. Please list the changes and provide the comparison and basis for such changes between the two analyses.

Response

In addition to the changes discussed above, the following additional changes were incorporated into the revised analysis:

1. No credit for removal of steam from the steam generators at the start of the accident is taken in the present analysis. The steam generators are assumed to be isolated at the start of the accident. In reality, there is a finite time required to isolate the steam generators after the start of the transient. This finite time has been conservatively factored into the revised analysis. A steam generator isolation time of 1.19 seconds (which represents a conservatively calculated minimum time for main turbine stop valve closure) was used in the revised analysis.

2. Both the present and revised analyses include 10% margin on the steam generator secondary side steam and water mass to maximize the available energy. The present analysis considers all steam generator metal energy to be available for transfer to the primary loop. For the revised mass and energy release analysis, the steam generator metal mass included only the portion of the steam generators in contact with the secondary side fluid. Metal heat from those portions of the steam generator (i.e., elliptical head, upper shell and miscellaneous internals) which have no potential for heat transfer to the reactor coolant system was not included in the revised analysis. This change results in a reduced energy transfer rate.

3. The revised analysis used the latest computer code for calculation of the mass and energy releases. With this version, an increased number of data points for the mass and energy release rates (specifically during the post-blowdown phase) are generated. This improved segmental representation of the data has resulted in some reduction in the mass and energy releases when compared to the earlier code version used in the present analysis.

It should be noted that the revised analysis incorporates only items considered to be within the realm of currently approved licensing basis models. Items considered to be outside of the approved models (such as the effect of ice condenser drain flow in supplementing the containment spray system or extension of the time for release of secondary side energies to be consistent with the FLECHT/SEASET test) which are known to add conservatism to the analysis were not included in the revised analysis.