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JUL 27 1994

U.S. Nuclear Regulatory Commission
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Washington, DC 20555

Gentlemen:

In the Matter of the Application of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

WATTS BAR NUCLEAR PLANT (WBN) - STEAM GENERATOR (SG) REFERENCE LEG INSULATION

This letter describes a recent engineering evaluation of SG level instrumentation and the related signals that initiate a reactor trip and provide control room indication following a major pipe rupture inside containment. As a result of this evaluation, TVA has determined that it is not necessary to insulate the SG reference legs at WBN and is retracting the previous commitment to install such insulation.

TVA's decision not to insulate the SG reference legs was previously discussed in Westinghouse topical report WCAP-13462, "Summary Report - Process Protection System Eagle 21 Upgrade, NSLB, MSS and TTD Implementation - Watts Bar Units 1 and 2," Revision 1, which was submitted in a letter dated May 23, 1994. This letter is intended to clarify and justify that decision. This letter also serves to modify the final report for Construction Deficiency Report (CDR) 390/79-33, which pertained to the potential errors resulting from heatup of the SG reference legs in a post-accident environment.

TVA originally committed to insulate the SG reference legs at WBN in a letter dated June 21, 1982. At that time, it was believed insulating the reference legs would alleviate concerns about a significant level measurement inaccuracy which could be caused by heatup of the water column in the reference leg following a high-energy line break inside containment. The potential for reference leg heatup was identified as a generic industry issue in Inspection and Enforcement (IE) Bulletin 79-21.

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JUL 27 1994

At WBN, the issue was also identified in Nonconformance Report (NCR) MEB 79-33, which was reported to the NRC staff in CDR 390/79-33. TVA's final report on CDR 390/79-33, dated June 30, 1983, reiterated the commitment to insulate WBN's SG reference legs as the primary corrective action to resolve the heatup concern.

The NRC staff accepted TVA's plan to insulate the SG reference legs in NUREG-0847, "Safety Evaluation Report Related to the Operation of Watts Bar Nuclear Plant, Units 1 and 2," Supplement No. 2 (WBN SSER 2), dated January 1984. TVA proceeded with this commitment and installed a mirror-type insulation on the reference legs in WBN Unit 1. NRC Inspection Report Nos. 50-390/84-52 and 50-391/84-41, dated August 15, 1984, reviewed the installed insulation, found it acceptable, and closed CDR 390/79-33 for Unit 1.

In 1986, the insulation was removed from the SG reference legs in Unit 1. This was done to facilitate the modification work that rerouted many of the instrument sensing lines in containment to reduce their length and provide adequate slope. After modifying the reference leg sensing lines, the original insulation components no longer fit and could not be reinstalled.

Prior to purchasing replacement insulation and as part of the Eagle-21 process protection system upgrade in 1991, TVA reassessed the basis for the original decision to insulate the reference legs. An engineering analysis determined that conventional insulation, including the mirror insulation previously installed at WBN, would not adequately delay heatup of the reference legs in a high-temperature, high-humidity, post-accident environment. In effect, the insulation could quickly saturate with steam and most of the thermal insulation benefit would be lost. TVA then considered other possibilities for WBN's reference legs which included modifying the insulation, installing a different type of insulation, or deleting the insulation altogether. Further engineering analysis determined that deleting the insulation was feasible while still assuring the safety functions associated with SG water level under post-accident conditions.

The principal safety function involves the reactor trip on low-low SG water level. Among the various accidents that are analyzed in Final Safety Analysis Report (FSAR) Chapter 15 and that create adverse environmental conditions, only the main feedwater line break (MFLB) analysis in FSAR Section 15.4.2.2 typically takes credit for the low-low SG level trip. TVA demonstrated for WBN that a reactor trip resulting from high containment pressure occurs prior to a trip from low-low SG level for any size of MFLB inside containment which eventually reduces SG inventory to the low-low level trip setpoint. The low-low SG level trip for a MFLB outside of containment is not affected by an uninsulated reference leg. Therefore, previous analysis results based on the low-low

JUL 27 1994

SG level reactor trip are conservative and continue to apply to WBN without modification. TVA revised FSAR Section 15.4.2.2.2 in Amendment 80, dated January 27, 1994, to adopt the above approach for analyzing a MFLB accident at WBN.

Note that TVA's engineering analysis of a MFLB inside containment considered cases beyond the conservative assumptions that were used for the licensing-basis analysis in FSAR Section 15.4.2.2. For instance, it was determined that the containment high pressure signal would promptly initiate a reactor trip even if the feedwater level control system operated normally and feedwater flow to the SG continued after the MFLB occurred. In this case, the low-low SG level reactor trip would be delayed. The licensing-basis analysis in FSAR Section 15.4.2.2 assumes that feedwater flow to the SGs stops at the beginning of the accident. TVA's engineering analysis also evaluated the sensitivity of the high containment pressure signal to increased containment volume and heat sink surface area. In all cases, the setpoint for the high containment pressure signal was reached before the setpoint for the low-low SG level trip signal was reached. TVA's investigations also noted that a precedent exists in the core reload analysis for McGuire which relies on the high containment pressure signal for mitigation of the MFLB accident.

Narrow-range SG water level signals are also used by WBN's post-accident monitoring system for control room indication in addition to the reactor trip function. FSAR Table 7.5-2 notes that these signals satisfy the requirements in Regulatory Guide (RG) 1.97, Revision 2, for variables that are classified as Type A, Category 1, and Type B, Category 1. TVA has confirmed that there is no effect on the ability of the SG water level instrumentation to satisfy these RG 1.97 requirements if the reference legs are not insulated. The primary function of SG water level as a RG 1.97 variable is to assist the operator in identifying and responding to a SG tube rupture accident. Reference leg insulation is not needed to assure accurate SG level indication for this accident since it does not create an adverse environment inside containment.

Based on the justifications presented above and an overall evaluation of the safety implications of SG reference leg heatup, TVA has determined that it is not necessary to insulate the SG reference legs or provide any special design features to compensate SG level signals for the possible effects associated with a post-accident environment inside containment. Therefore, TVA withdraws the commitment to insulate WBN's SG reference legs.

JUL 27 1994

If you have any questions about the information provided in this letter, please telephone John Vorees at (615) 365-8819.

Sincerely,

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