TENNESSEE VALLEY AUTHORITY
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AUG 25 1989

WBRD-50-390/87-22
WBRD-50-391/87-26

10 CFR 50.55(e)

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

Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) UNITS 1 AND 2 - FAILURE TO CONSIDER REACTOR CORE DECAY HEAT IN DETERMINING MOST SEVERE TIME DEPENDENT ACCIDENT TEMPERATURE PROFILE - WBRD-50-390/87-22 AND WBRD-50-391/87-26 - REVISED FINAL REPORT

The subject deficiency was initially reported to NRC Region II Inspector Gordon Hunegs on December 1, 1987, in accordance with 10 CFR 50.55(e) as Condition Adverse to Quality Report (CAQR) WBF 870061. Our final report was submitted on August 30, 1988. Enclosure 1 is our revised final report. Enclosure 2 is a list of commitments associated with this deficiency. As stated previously, we no longer consider 10 CFR Part 21 applicable to this deficiency. Further evaluation indicates that this deficiency was not the result of vendor-supplied information.

If there are any questions, please telephone G. R. Ashley at (615) 365-8527.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

M. L. Ray for

Manager, Nuclear Licensing
and Regulatory Affairs

Enclosures
cc: See page 2

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U.S. Nuclear Regulatory Commission

AUG 25 1989

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ENCLOSURE 1

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
FAILURE TO CONSIDER REACTOR CORE DECAY HEAT IN
DETERMINING MOST SEVERE TIME DEPENDENT
ACCIDENT TEMPERATURE PROFILE
WBRD 50-390/87-22 AND WBRD 50-391/87-26
CAQR WBF 870061
10 CFR 50.55(e)

REVISED FINAL REPORT

Description of Deficiency

During the development of the Watts Bar time dependent environmental qualification accident temperature profile for the lower compartment, there was a failure to consider the long-term effects of a main steam line break (MSLB) inside containment for a plant going to hot standby conditions as opposed to cold shutdown. The present profile shown on drawing 47E235-42 (R2) reflects the peak temperature from a MSLB at the initiation of an accident and decreases over time as would occur when going to a cold shutdown condition. It has been determined that long-term primary system heat loads, because of decay heat at a hot standby condition, will result in higher long-term temperatures than those reflected on drawing 47E235-42 (R2). The long-term lower compartment temperature would not exceed the peak temperature experienced immediately following an MSLB, but the temperature would exceed the long-term qualification limits which have been established for safety-related equipment.

The root cause of this deficiency is a combination of two factors: (1) premature termination of the MSLB temperature profile analysis by Westinghouse, and (2) design oversight on the part of TVA when extrapolating beyond the time covered by the Westinghouse analysis. The Westinghouse analysis for an MSLB was terminated after the initial mass steam release and ice condenser meltout. It was believed that, after that release and meltout, the post-MSLB containment temperature profile was bound by that of the post loss of coolant accident (LOCA) because the lower containment temperature was declining as a result of containment spray and air return fan actuation. As a result, TVA reflected this in the post-MSLB profile. However, after ice bed meltout, the decay heat emitted by the reactor coolant system pipes and pumps during hot shutdown results in gradually increasing temperatures in subcompartments of lower containment for ice condenser plants which do not occur during long-term post-LOCA cold shutdown. Therefore, TVA considers this deficiency to be an isolated incidence of design oversight during the development of the time dependent environmental qualification accident temperature profile.

Safety Implications

With the long-term higher temperatures, which result from an extended period at hot standby conditions, the operability of equipment important to safety for the required 100 days following a MSLB accident is questionable. Therefore, had it remained uncorrected, this deficiency could have adversely affected safe operation of the plant.

Corrective Actions

In order to ensure the operability of equipment important to safety in lower containment, TVA will complete the following actions:

1. The lower compartment cooler (LCC) units and associated ducting will be upgraded to safety grade, with the exception of the LCC coils. This upgrade will provide a fully qualified means of providing air circulation by the LCC fans and ductwork to lower containment to prevent hot spots from forming in compartments.

2. The coatings inside containment are not qualified for an MSLB since the ability to recirculate coolant from the containment sump was not previously considered necessary. With the increased long-term containment temperatures, this will become necessary. Therefore, in order to ensure the availability of the WBN containment sumps, an evaluation of the containment coatings for possible sump screen blockage will be performed.

3. The long-term temperature profile for lower containment will be determined for the duration of the design basis MSLB event using the Ice Condenser and Containment Spray Systems as the safety-grade systems for removing containment ambient heat post MSLB.

4. The components in lower containment necessary to mitigate a MSLB will be qualified to the calculated MSLB temperature profile.

All corrective actions will be completed before fuel load of the respective unit. Since decay heat is now considered in the temperature analysis, no further action is required to prevent recurrence.

ENCLOSURE 2

LIST OF COMMITMENTS

The following is the list of commitments intended by this report, and they will be completed by fuel load of the respective unit.

1. The lower compartment cooler (LCC) units and associated ducting will be upgraded to safety grade, with the exception of LCC coils.

2. In order to ensure the availability of the WBN containment sumps, an evaluation of the containment coatings for possible sump screen blockage will be performed.

3. The long-term temperature profile for lower containment will be determined for the duration of the design basis main steam line break (MSLB) event, using ice condenser and containment spray systems as the safety-grade systems for removing containment ambient heat post MSLB.

4. The components in lower containment necessary to mitigate a MSLB will be qualified to the calculated MSLB temperature profile.