Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

John A. Scalice
Site Vice President, Watts Bar Nuclear Plant

NOV 12 1996

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

Gentlemen:

In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) - EMERGENCY CORE COOLING SYSTEM (ECCS) EVALUATION MODEL CHANGES - ANNUAL REPORT

The purpose of this letter is to provide an annual report in accordance with 10 CFR 50.46 as a result of changes or errors discovered in the WBN ECCS evaluation model that affect the calculation of peak cladding temperatures.

Since WBN's last report was submitted, Westinghouse Electric Corporation has notified TVA of ECCS model computer code corrections that affect the WBN analyses for the small-break loss-of-coolant accident (SBLOCA). Westinghouse has contractual responsibility for maintaining WBN's ECCS evaluation model. The recent changes to the ECCS model are described in detail in Enclosure 1. The peak cladding temperature (PCT) margin allocations resulting from the changes listed in Enclosure 1 are summarized in Enclosure 2.

These changes were reported to TVA by Westinghouse in letters dated February 9, 1996, and July 10, 1996. As indicated in Enclosure 2, the sum of the absolute values of their PCT margin allocations is 45°F, and therefore, do not exceed the threshold defined in 10 CFR 50.46(a)(3)(i) for a "significant" change of more than 50°F in calculated PCT. However, in previous reports of

9611180147 961112
PDR ADOCK 05000390
P PDR
180014

D030 1/1

NOV 12 1996

ECCS evaluation model changes, TVA identified cumulative changes that affected WBN's SBLOCA analysis and exceeded the threshold for a change of more than 50°F in calculated PCT. As a result, TVA's August 28, 1995, letter committed to perform a SBLOCA reanalysis no later than the end of WBN's third refueling outage. TVA has reviewed the schedule for this commitment in consideration of the additional ECCS model changes described in Enclosure 1. The review determined that there is no need to accelerate the schedule for SBLOCA reanalysis.

There have been no additional changes in the parts of the ECCS model that are used to analyze a large-break loss-of-coolant accident (LBLOCA) since the last report. However, as a result of previous reports of ECCS evaluation model changes that affected WBN's LBLOCA analysis and exceeded the 50°F threshold (discussed in TVA letters to the Staff dated August 28, 1995 and July 28, 1993), TVA remains committed to perform a LBLOCA reanalysis no later than the end of WBN's second refueling outage. A summary of PCT margin allocations affecting the LBLOCA analysis is also provided in Enclosure 2.

If you should have any questions, please contact P. L. Pace at (423) 365-1824.

Sincerely,

J. A. Scalice

Enclosures
cc: See page 3

NOV 1 2 1996

cc (Enclosures):

NRC Resident Inspector
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381

Mr. Robert E. Martin, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE 1

DESCRIPTION OF CHANGES WHICH AFFECT WBN'S EMERGENCY CORE COOLING SYSTEM EVALUATION MODEL AND ITS CALCULATION OF PEAK CLADDING TEMPERATURE

1. NOTRUMP SPECIFIC ENTHALPY ERROR

Background

A typographical error was found in a line of coding in the NOTRUMP code. This line of coding was intended to model the calculation found in Equation L-127 of WCAP-10079-P-A. Although the equation in the topical report is correct, the coding represented the last term as a partial derivative with respect to the fluid node mixture region total energy instead of the mixture region total mass. This correction is a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Estimated Effect

Representative plant calculations have led to an estimated effect of +20°F for this error correction.

Affected Evaluation Model

1985 Westinghouse Small Break LOCA Evaluation Model Using NOTRUMP

2. SALIBRARY DOUBLE PRECISION ERRORS

Background

During migration of the LOCA codes from the CRAY computer to UNIX-based platforms, programming errors were made in two library routines related to improper specification of double precision variables. These errors were found and fixed during later code maintenance.

Estimated Effects

Test cases with individual codes in the models demonstrated very small differences in only the SATAN and NOTRUMP code results, with correspondingly minor effects on final peak clad temperature predictions. Because the error only effects a very limited number of LBLOCA analyses which were performed on the UNIX platform prior to correcting the codes, the evaluation of effects for LBLOCA analyses were assessed on a plant-specific bases. For SBLOCA analyses performed on the UNIX platform, representative plant calculations resulted in an estimated generic effect of -15°F for affected analyses.

2. SALIBRARY DOUBLE PRECISION ERRORS (continued)

Affected Evaluation Models

1981 Westinghouse Large Break LOCA Evaluation Model Using BASH
1985 Westinghouse Small Break LOCA Evaluation Model Using NOTRUMP

3. SBLOCTA FUEL ROD INITIALIZATION

Background

An error was discovered in the SBLOCTA code related to adjustments which are made as part of the fuel rod initialization process which is used to obtain agreement between the SBLOCTA model and the fuel data supplied from the fuel thermal-hydraulic design calculations at full power, steady-state conditions. Specifically, an adjustment to the power, which is made to compensate for adjustments to the assumed pellet diameter was incorrect. Additionally, updates were made to the fuel rod clad creep and strain model to correct logic errors that could occur in certain transient conditions. These model revisions had a small effect on the fuel rod initialization process, and could produce small effects during the transient. Due to the small magnitude of effects, and the interaction between the two items, they are being evaluated as a simple, closely related effect.

Estimated Effects

Representative plant calculations with the corrected model demonstrated that these revisions result in a predicted peak clad temperature increase on the order of +10°F. This 10°F penalty will be assessed against all existing analyses of record with the above model.

Affected Evaluation Models

1985 Westinghouse Small Break LOCA Evaluation Model with NOTRUMP

Enclosure 2

SUMMARY OF PEAK CLADDING TEMPERATURE MARGIN ALLOCATIONS RESULTING FROM CHANGES TO THE EMERGENCY CORE COOLING SYSTEM EVALUATION MODEL

Large-Break Loss-of-Coolant Accident:	PCT (°F)
A. ANALYSIS OF RECORD (8/87) (Based on BASH evaluation model with F_Q=2.40, $F_{\Delta H}$=1.58, SGTP=10% and VANTAGE 5H fuel)	2126
B. PRIOR MODEL ASSESSMENTS (Refer to letters dated July 22, 1991, July 13, 1992, March 17, 1993, November 10, 1993, April 23, 1994, May 8, 1995, and August 28, 1995.)	+24
C. CURRENT MODEL ASSESSMENTS (11/96) (Permanent assessment of PCT margin) 1. None	0
LICENSING BASIS PCT + MARGIN ALLOCATIONS	2150

Small-Break Loss-of-Coolant Accident:	
A. ANALYSIS OF RECORD (6/94) (Based on NOTRUMP evaluation model with F_Q=2.40, $F_{\Delta H}$=1.58, SGTP=10%, and VANTAGE 5H fuel)	1452
B. PRIOR MODEL ASSESSMENTS (Refer to letters dated May 8, 1995 and August 28, 1995.)	+39
C. CURRENT MODEL ASSESSMENTS (11/96) (Permanent assessment of PCT margin)	
1. NOTRUMP Specific Enthalpy Error	+20
2. SALIBRARY Double Precision Errors	-15
3. SBLOCTA Fuel Rod Initialization Error	+10
LICENSING BASIS PCT + MARGIN ALLOCATIONS	1506