TVA

Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

April 30, 2012

10 CFR 50.4
10 CFR 50.46

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Browns Ferry Nuclear Plant, Unit 1
Facility Operating License No. DPR-33
NRC Docket No. 50-259

Subject: 10 CFR 50.46 Annual Report for Browns Ferry Nuclear Plant, Unit 1

Reference: TVA Letter to NRC, "10 CFR 50.46 Annual Report," dated June 3, 2011

The purpose of this letter is to provide the annual report of changes or errors discovered in the Emergency Core Cooling System (ECCS) evaluation model for the Browns Ferry Nuclear Plant, Unit 1. In accordance with 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems (ECCS) for Light-Water Nuclear Power Reactors," paragraph (a)(3)(ii), the enclosed report describes the nature and the estimated effect on the limiting ECCS analysis of changes or errors discovered since submittal of the reference letter. There was no change or error such that the sum of the absolute magnitudes of the respective temperature changes is greater than 50° F.

There are no regulatory commitments in this letter. Please direct questions concerning this issue to T. A. Hess at (423) 751-3487.

Respectfully,

J. W. Shea
Manager, Corporate Nuclear Licensing

Enclosure: 10 CFR 50.46 Annual Report

cc (Enclosure): NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Browns Ferry Nuclear Plant

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NRR

ENCLOSURE

BROWNS FERRY NUCLEAR PLANT, UNIT 1

10 CFR 50.46 ANNUAL REPORT

ENCLOSURE

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Reference:

1. *GE - Hitachi Report 0000-0115-3713-R0, "Browns Ferry Nuclear Plant Unit 1 Supplementary Report of ECCS-LOCA Additional Single Failure Evaluation at Current Licensed Thermal Power," March 2010.*

The Unit 1 core currently contains only the GE14 fuel design. Reference 1 contains the baseline Peak Clad Temperature (PCT) value of 1920 °F that was previously established for this fuel type.

<u>Description of Changers or Errors Relative to the Previous Report</u>

In July 2011, GE Hitachi notified TVA of a database error that affected input coefficients used to direct the deposition of gamma radiation energy produced by fuel, determining whether it would heat the fuel rod, cladding, channel, or control rod structure materials. The input caused the heat deposited in the fuel channel (post scram) to be over predicted and the corresponding heat to the fuel to be under predicted. This effect was seen to be non-conservative. The error only applies to 10x10 fuel and increased the PCT by + 25 °F.

In July 2011, GE Hitachi notified TVA of an updated formulation for gamma heat deposition in the channel wall for 9x9 and 10x10 fuel assemblies. An examination of the existing formulation revealed that the contribution of heat from gamma ray absorption by the channel was found to have been minimized. The method had been simplified such that initially all the energy was assumed to be deposited in the fuel rods prior to the Loss of Coolant Accident (LOCA) and then adjusted such that the correct heat deposition was applied after the scram. This modeling was concluded to be potentially non-conservative, as not accounting for this small fraction of total power generation outside the fuel rod would tend to suppress the hot bundle power required to meet the initial operating Planar Linear Heat Generation. Further, there is a small effect on the initial conditions for the balance of the core, as these are set in relation to the hot bundle condition. The energy distribution during the pre-scram phase was updated with the appropriate energy distribution. Since the integral heat deposition is dominated by post-scram energy, the change has only a small impact on the results, increasing PCT by + 15 °F.

Cumulative Effect of PCT Changes - Unit 1	
Baseline PCT	1920°F
Input coefficient database error	25°F
Revised gamma heat deposition formulation	15°F
Accumulated changes since baseline analysis	40°F
New licensing PCT	1960°F