November 8, 2004

10 CFR 50.46

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

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - 10 CFR 50.46 ANNUAL REPORT OF NON-SIGNIFICANT CHANGES

Reference: TVA letter to NRC dated November 20, 2000, "Sequoyah Nuclear Plant (SQN) - 10 CFR 50.46 Annual Report"

The purpose of this letter is to provide changes to the calculated peak fuel cladding temperature resulting from recent changes to the SQN Emergency Core Cooling System (ECCS) evaluation model. This submittal satisfies the annual reporting requirements in accordance with 10 CFR 50.46(a)(3)(ii). Enclosure 1 contains a summary of the recent changes to the SQN ECCS evaluation model and the effect of these changes on the calculated peak fuel cladding temperature. Enclosures 2 and 3 provide a detailed discussion of the changes to the large break loss-of-coolant accident summarized in Enclosure 1.

These changes have occurred since the last annual report that was submitted by the above reference.

Please direct questions concerning this issue to me at (423) 843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

Original signed by Jim Smith for

Paul L. Pace
Manager, Site Licensing
and Industry Affairs

Enclosures
cc (Enclosures):
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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY (TVA)
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

SEQUOYAH NUCLEAR PLANT (SQN) - 10 CFR 50.46
ANNUAL REPORT OF NON-SIGNIFICANT CHANGES

In accordance with the annual reporting requirements of 10 CFR 50.46 (a)(3)(ii), the following is a summary of recent changes to the Sequoyah Emergency Core Cooling System (ECCS) evaluation model and the effect of these changes on the calculated peak fuel cladding temperature.

Large Break Loss-of-Coolant Accident (LB LOCA)

	PCT	Enclosure
Previous Licensing Basis Peak Cladding Temperature (PCT) (Reported November 20, 2000)	2190°F	
1. Low Pressure Drop Fuel Assembly Transition Core Penalty Deletion	-5°F	2
2. Change in Fuel Cladding Material from Zircaloy IV to M5	-28°F	3
Updated Licensing Basis PCT	2157°F	
Net Change	-33°F	

Small Break Loss-of-Coolant Accident (SB LOCA)

	PCT
Previous Licensing Basis PCT (Reported November 25, 1997)	1162°F
Updated Licensing Basis PCT	1162°F
Net Change	None

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY (TVA)
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

SEQUOYAH NUCLEAR PLANT (SQN) - 10 CFR 50.46
ANNUAL REPORT OF NON-SIGNIFICANT CHANGES

LOW PRESSURE DROP FUEL ASSEMBLY TRANSITION CORE PENALTY

Background

The Sequoyah reload fuel supplier Framatome Advanced Nuclear Power (FANP) developed a new fuel assembly top and bottom nozzle design, which enhances the performance of the FANP Mark-BW17 reload fuel type. The updated nozzle design incorporates a modified grill pattern that increases the nozzle flow area and reduces the pressure drop across the fuel assembly. The design of the nozzle will reduce the full flow pressure drop across the reactor core by approximately 0.5 pound per square inch differential (psid) when the modified nozzles are installed for a full core application. The reload fuel supplied to Sequoyah included the modified nozzle design beginning with the fresh fuel assemblies supplied for the Unit 1 Cycle 11 core (Spring 2000).

To support the use of the modified fuel nozzle design, FANP performed a number of large break loss-of-coolant accident (LB LOCA) sensitivity studies using the current Sequoyah emergency core cooling system (ECCS) evaluation model. The study indicated that there will be no calculated peak fuel cladding temperature increase for the full core application of the low pressure loss nozzle design. During the transition to a full core of low pressure drop fuel assemblies, FANP indicated that the original fuel assemblies may experience a small decrease in coolant flow when residing with the modified assemblies. This small reduction in flow results from the preferential flow of coolant through the low resistance fuel assemblies. The reduced flow will result in a slightly higher calculated peak clad fuel temperature for the fuel assemblies with the original nozzle design. FANP performed a number of additional LB LOCA sensitivity studies using the Sequoyah plant specific ECCS evaluation model to establish a bounding fuel assembly peak clad temperature increase for the transition cores. Based upon sensitivity calculations performed by FANP, a 5°F penalty was applied to the calculated peak fuel cladding temperature to bound the hydraulic effect of the low pressure drop fuel assemblies in the transition cores.

Results

With the loading of the Unit 2 Cycle 13 core in November 2003, all of the fuel assemblies in current operation at Sequoyah Units 1 and 2 contain the modified top and bottom nozzle design. The 5°F penalty applied to the calculated peak fuel cladding temperature to bound the hydraulic effect of the low pressure drop fuel assemblies in the transition cores has been deleted accordingly.

ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY (TVA)
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

SEQUOYAH NUCLEAR PLANT (SQN) - 10 CFR 50.46
ANNUAL REPORT OF NON-SIGNIFICANT CHANGES

USE OF FRAMATOME M5 FUEL CLADDING MATERIAL

Background

The Sequoyah reload fuel supplier Framatome Advanced Nuclear Power (FANP) developed a new cladding and structural material design which, enhances the performance of the FANP Mark-BW17 reload fuel type. The new zirconium alloy material, referred to as M5 material, is designed for high fuel rod burnup service. It exhibits improved corrosion resistance and reduced irradiation induced growth when compared to the original material (Zircaloy IV). The use of reload fuel assemblies using the M5 cladding material was approved by NRC in a safety evaluation report dated July 31, 2000, issued in response to Sequoyah Technical Specification Change Request No. TVA-SQN TS-00-16. The reload fuel supplied to Sequoyah has been fabricated using the M5 material beginning with the fresh fuel assemblies supplied for the Unit 2 Cycle 12 core (Spring 2002).

To support the use of the M5 fuel cladding material, FANP performed a number of large break loss-of-coolant accident (LB LOCA) sensitivity studies using the current Sequoyah emergency core cooling system (ECCS) evaluation model. The studies applied the M5 thermal/material properties to the ECCS evaluation model and established that the M5 material reduced the calculated peak clad temperature (PCT) for the limiting fuel assembly when compared to the original Zircaloy IV material. Based on these results, it was concluded that the ECCS evaluation results using the Zircaloy IV material bound operation with the M5 cladding material. No penalties for the transition from Zircaloy IV to M5 cladding material were required.

Results

Beginning with the Unit 2 Cycle 12 core reload, all fresh reload fuel assemblies for Sequoyah have been manufactured with the M5 cladding material. The M5 fuel assemblies have been replacing the Zircaloy IV fuel assemblies at the rate of approximately one third of the core per cycle. The current Unit 1 Cycle 14 core contains a single fuel assembly with Zircaloy IV cladding that is once burned. The current Unit 2 Cycle 13 core contains 42 Zircaloy IV clad fuel assemblies, all of which are twice burned and located in low-power, periphery-core positions. The limiting LB LOCA results obtained using the FANP ECCS evaluation model are always obtained for fresh fuel assemblies. Since all fresh fuel assemblies currently in operation at Sequoyah Units 1 and 2 contain M5 cladding, the limiting ECCS evaluation results for the Zircaloy IV cladding material are being replaced by the results obtained for the M5 cladding material.

The analysis performed by FANP established a net 28°F reduction in calculated LB LOCA PCT for the M5 cladding material.