

April 4, 2000

Mr. J. A. Scalice  
Chief Nuclear Officer  
and Executive Vice President  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, Tennessee 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 - CLOSEOUT OF GENERIC LETTER 96-06 RESPONSES (TAC NOS. M96866 AND M96867)

Dear Mr. Scalice:

The U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 96-06, entitled "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions," on September 30, 1996. The Tennessee Valley Authority (TVA) provided responses to the GL for the Sequoyah Nuclear Plant, Units 1 and 2, on October 30, 1996, and January 28, 1997; and provided responses to two separate NRC Requests for Additional Information on August 31, 1998, and December 21, 1998.

The GL included a request for licensees to evaluate cooling water systems that serve reactor containment air coolers to assure that they are not vulnerable to water hammer and two-phase flow conditions. The GL was also concerned with vulnerability of piping systems that penetrate the containment to a water solid volume that may be subjected to an increase in pressure due to heating of the trapped fluid.

The NRC staff has completed its review of the responses submitted by TVA and has concluded that TVA has provided an acceptable resolution to the GL 96-06 concerns. The enclosure provides the staff's evaluation and documentation of its review. If you have any questions regarding this matter, please contact me at (301) 415-2010.

Sincerely,

*/RA/*

Ronald W. Hernan, Senior Project Manager, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosure: Staff Evaluation Report

cc w/encl: See next page

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## NRC STAFF EVALUATION REPORT FOR RESOLUTION OF

### GENERIC LETTER 96-06 ISSUES AT SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2

#### INTRODUCTION

The U. S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," on September 30, 1996, which included a request for licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to water hammer and two-phase flow conditions. The Tennessee Valley Authority (TVA) provided responses to the GL for the Sequoyah Nuclear Plant, Units 1 and 2, on October 30, 1996, and January 28, 1997; and provided responses to two separate NRC Requests for Additional Information on August 31, 1998, and December 21, 1998.

#### THERMALLY INDUCED PRESSURIZATION OF PIPING RUNS

The NRC staff's letter dated May 27, 1998, requested additional information on this topic, to which TVA responded by letter dated December 21, 1998.

In its submittal of January 28, 1997, TVA stated that piping systems that penetrate the containment are not vulnerable to a water solid volume that may be subjected to an increase in pressure due to heating of the trapped fluid. TVA also stated that the penetrations have been designed or analyzed for thermal expansion of fluid with thermal overpressure relief lines relieving back to containment from the penetrations. TVA relied on valve leakage for isolated sections of piping inside the containment to provide inherent pressure relief for four systems. The affected three systems are: the waste disposal system, the safety injection system, and the primary makeup water system.

TVA, in its submittal of January 28, 1997, has taken credit for a relief valve on the demineralized water system (DWS) and valve leakage on the spent fuel pool cooling system (SFPCS) piping located inside the containment. In its submittal of December 21, 1998, TVA stated that based on its re-evaluation, it has drained the appropriate piping sections of DWS and SFPCS, and revised appropriate general and system operating procedures to ensure that the DWS and SFPCS piping inside the containment is drained prior to power operation to eliminate concerns with thermal overpressurization.

In its December 21, 1998, response to the NRC Request for Additional Information dated May 27, 1998, TVA provided to the staff its design criteria for (1) piping and valves, (2) pressure and associated uncertainty at which the valves were determined to lift-off their seats or leak, and (3) the maximum calculated stress in piping based on estimated lift-off or leakage pressure.

The NRC staff finds that the licensee's evaluation is reasonable and provides an acceptable resolution for the issue of thermally-induced pressurization of piping runs penetrating the containment.

ENCLOSURE

## WATER HAMMER AND TWO-PHASE FLOW ISSUES

GL 96-06 requested licensees to evaluate cooling water systems that serve containment air coolers to assure that they are not vulnerable to water hammer and two-phase flow conditions. TVA provided its assessment for Sequoyah on January 28, 1997, and provided additional information by letter dated August 31, 1998.

Based upon the information provided in TVA's submittals, it is the NRC staff's understanding that the water hammer and two-phase flow concerns discussed in GL 96-06 would only be applicable if a relief valve in the essential raw cooling water (ERCW) system failed open during the event scenario. In this particular case, the licensee feels that venting of the ERCW system through the open relief valve would cushion the effects of water hammer such that system integrity will not be challenged. For added assurance that water hammer will not pose a problem, TVA planned to revise emergency plan implementing procedures to include a precaution to consider the potential for water hammer when restarting ERCW after a design-basis accident.

The NRC staff is satisfied with TVA's response and considers the water hammer and two-phase flow elements of GL 96-06 to be closed.

## CONCLUSION

Based upon the discussions above, TVA has provided sufficient information to allow the NRC staff to conclude that cooling water systems that serve containment air coolers are not particularly vulnerable to the water hammer and two-phase flow conditions discussed in GL 96-06. This report concludes the NRC staff's review effort on this subject.

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Date: April 4, 2000

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**SEQUOYAH NUCLEAR PLANT**

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