Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37379

Jack L. Wilson
Vice President, Sequoyah Nuclear Plant

January 3, 1992

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

Gentlemen:

In the Matter of ) Docket No. 50-328
Tennessee Valley Authority )

SEQUOYAH NUCLEAR PLANT (SQN) - TEMPORARY REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME) CODE FOR PIN-HOLE LEAK ON UNIT 2 LOWER CONTAINMENT VENT COOLER 2-A

Reference: TVA letter to NRC dated December 2, 1991, "Sequoyah Nuclear Plant (SQN) - Temporary Relief From American Society of Mechanical Engineers (ASME) Code for Weld Leakage on Component Cooling System (CCS) Heat Exchangers (HX's) 0B2 and 2A1"

This letter provides a temporary request for relief from the ASME code regarding replacement of a cooling coil on SQN's Unit 2 lower containment vent cooler 2-A. At the present time a pin-hole leak exists on the cooler coil (1 1/2-inch-diameter copper supply header). This relief request is being submitted under 10 CFR 50.55a(g)(5)(iii) and is in accordance with guidance provided by NRC staff as outlined in the above reference.

The cooling medium for the subject cooler is essential raw cooling water (ERCW). TVA has evaluated the operability of the cooler with regard to ERCW flow rate requirements and the effects of spray on adjacent tubes and the structural integrity of the cooler. TVA's evaluation for operability indicates that the subject cooler will perform its design basis function. Until repair or replacement is performed, an inspection of the cooler will be conducted on a weekly basis to assess structural integrity and to ensure that there is no further degradation beyond the available ERCW flow margin. TVA will perform the ASME code repair or replacement before start-up from the Unit 2 Cycle 5 refueling outage.

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Enclosure 1 provides TVA's request for relief from the ASME Section XI code. Enclosure 2 contains TVA commitments associated with this submittal.

Please direct questions concerning this issue to D. V. Goodin at (615) 843-7734.

Sincerely,

J. W. Wilson

Enclosures
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ENCLOSURE 1

SEQUOYAH NUCLEAR PLANT (SQN)
REQUEST FOR RELIEF - ESSENTIAL RAW COOLING WATER (ERCW)
LOWER CONTAINMENT VENT COOLER (LCVC) 2-A

UNIT: SQN Unit 2

COMPONENTS: LCVC 2-A

SYSTEM: ERCW

ASME CODE CLASS: 3

FUNCTION: SQN Unit 2 is equipped with four LCVCs (2-A thru 2-D). The 2B and 2-D coolers serve as the 'B' train coolers and are supplied by a 'B' train ERCW header. The 2-A and 2-C coolers serve as the 'A' train coolers and are supplied by the 'A' train ERCW supply header. The design basis function of the LCVCs is to ensure that adequate heat removal capacity is available to provide long-term cooling following a non-LOCA (loss of coolant accident) event (refer to Technical Specification [TS] 3.6.2.2). During normal operation (Mode 1), the LCVCs may be utilized to maintain lower containment air temperature between the TS limit of 100 degrees Fahrenheit (F) and 125 degrees F (refer to TS 3.6.1.5).

IMPRACTICAL CODE REQUIREMENTS: When an American Society of Mechanical Engineers (ASME) Section XI code repair or replacement is performed, it is required to be conducted in accordance with ASME Section XI, IWA-4000 or IWA-7000 respectively to restore structural integrity to the original design requirements. Temporary relief is requested as the cooler coil is not scheduled for replacement until the Unit 2 Cycle 5 refueling outage.

BACKGROUND: On December 11, 1991, a pin-hole leak was discovered in a 1 1/2-inch-diameter copper supply header on LCVC 2-A. A work request was initiated to repair the leak.

Upon discovery of the leak, TVA evaluated the operability of the LCVC 2-A. The estimated leakage from LCVC 2-A is less than 1 gallon per minute (gpm). The required flow rate is 200 gpm. The actual flow rate is 281 gpm based on the last performance of the ERCW flow balancing test. The spray from the leak was not of sufficient velocity to damage adjacent tubes. Spray from the leaking tube did not present a danger to surrounding equipment. Since sufficient flow with adequate margin is being supplied to the room cooler, it was determined that operability of LCVC 2-A was not impaired.

On December 20, 1991, the cooler was removed from service and the pin-hole was repaired by brazing. Upon returning the cooler to service, a new pin-hole leak was discovered on the same 1 1/2-inch-diameter copper supply header. The estimated leakage from the new pin-hole leak remains within 1 gpm. Because of the small clearance (4-5 inches) between the supply header and the cooler housing, access to perform a braze repair is extremely limited. Accordingly, the probability of an adequate braze repair is low.

An evaluation was performed to address the structural integrity of LCVC 2-A with the leakage present (see the attachment to this enclosure). This evaluation indicates that the leaking header does not present a danger to the integrity of the ERCW system or LCVC 2-A.

ALTERNATIVE REQUIREMENTS:

1VA will continue to operate with the pin-hole leak until the cooler coil can be replaced. An inspection of the cooler will be performed on a weekly basis by the system engineer. The system engineer will assess the structural integrity of LCVC 2-A and verify that there is no further degradation beyond the available margin of cooling water flow rate.

ATTACHMENT TO ENCLOSURE 1

STRUCTURAL INTEGRITY EVALUATION FOR
LOWER CONTAINMENT VENT COOLER 2-A

SEQUOYAH NUCLEAR PLANT (SQN)
ENGINEERING EVALUATION OF THE STRUCTURAL INTEGRITY
OF THE UNIT 2 LOWER CONTAINMENT VENT COOLER (LCVC) 2-A

## Problem Definition

A pin-hole leak has developed in the Unit 2 LCVC 2-A. These room coolers, which utilize the essential raw cooling water system as the heat transfer mechanism, are composed of a structural housing containing a system of copper tubes joined to copper headers by a brazed connection. The location of the pin-hole leak is in a 1 1/2-inch-diameter copper supply header.

## Component Structural Description

The LCVCs are end-use devices. As an end-use device, the component performs three functions. The component is a flow path (pressure boundary), a support structure, and a processor of the flowing fluid. The process is heat transfer. The coolers separate the three functions (flow path, structure, and process) by use of sub-components. A copper tube distribution network provides a flow path from the piping system interface to and including the heat exchanger area. Framework, housings, and bracing within the framework provide component structure support. For a cooler, the process requires primary emphasis on heat transfer characteristics. Copper tubing achieves good heat transfer characteristics at the expense of rigid structural characteristics. Consequently, the single copper supply header does not significantly contribute to the structural strength of the room cooler. The structural strength is provided by the framework, housing, internal bracing, and tube bundle.

## Structural Integrity Assessment

A structural and metallurgical assessment of the pin-hole leak in the LCVC 2-A cooler was made by TVA. This assessment concluded that the pin-hole leak in the copper supply header will not degrade the structural integrity of the cooler. The basis for this conclusion is as follows:

1. Stresses in the copper header are normally low and would not cause the size of the pin-hole to increase. Deadweight and seismic stresses will be low because the copper supply header is a short span that is well supported by the piping supports and cooler framework. Therefore, crack growth from applied loads is not expected.

2. The most likely cause of the pin-hole leak is flow-induced erosion of the wall of the copper header. Although this mechanism is still present, past experience has shown that increased leakage is minimal following the formation of the initial leak. This is basically because of the high fracture toughness properties of the copper tubing and the low fluid operating pressures.

Leakage will be monitored and trended to ensure that essential cooling capacity of the cooler is maintained. This trending will also provide assurance that the structural integrity is not degraded.

3. The cooler framework, housing, and bracing provide the essential structural strength of the cooler. A single pin-hole leak in a single copper header has no significant effect on the strength of the structure.

Conclusion

A pin-hole leak in the copper header of SQN's LCVC 2-A will not degrade the structural integrity of the cooler.

ENCLOSURE 2

COMMITMENTS

1. TVA will repair or replace the pin-hole leak on lower containment vent cooler 2-A before start-up from the Unit 2 Cycle 5 refueling outage.

2. Structural integrity and flow margin of the lower containment vent cooler 2-A will be ensured on a weekly basis by monitoring the leakage for further degradation. Weekly monitoring will continue until replacement is complete (before start-up from the Unit 2 Cycle 5 refueling outage).