TENNESSEE VALLEY AUTHORITY

Sequoyah Nuclear Plant
P.O. Box 2000
Soddy Daisy, Tennessee 37379

July 11, 1988

10 CFR 50.12

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

Gentlemen:

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

SEQUOYAH NUCLEAR PLANT - CONTAINMENT ISOLATION SYSTEM - EXEMPTION FROM APPENDIX J, TYPE C LEAK TESTING - RESIDUAL HEAT REMOVAL (RHR) SPRAY AND CONTAINMENT SPRAY (CS) SYSTEMS

References: 1. TVA letter to NRC dated January 2, 1987, "Sequoyah Nuclear Plant - Containment Isolation Design Pertaining to the Chemical and Volume Control System"

2. TVA letter to NRC dated December 31, 1986, "Sequoyah Nuclear Plant - Containment Isolation System - Exemption from Appendix J Leak Testing - Residual Heat Removal and Upper Head Injection Systems and Pressure Relief Valves"

This letter transmits a brief description of the RHR spray and CS system configurations following a postulated loss of coolant accident (LOCA), the design features of those systems that prevent the escape of containment atmosphere, and a discussion of the applicable basis for requesting an exemption from type C leak rate testing under the criteria of 10 CFR 50.12 for the two systems. We request that you review our request for exemption and advise us in writing of your determination. The exemption is based on the containment isolation system description provided in reference 1. The request for exemption is similar to the request made for the upper head injection system in reference 2.

A check for the $150 application fee required by 10 CFR 170.12 for the review of our request for exemption will be wired separately.

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Please direct questions concerning this issue to Michael J. Ray at (615) 870-6422.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

Michael J. Ray
Nuclear Licensing and
Regulatory Affairs

Sworn to and subscribed before me
this 11th day of July 1988

Alice K. Chadwick
Notary Public
My Commission Expires 9/19/89

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ENCLOSURE

REQUEST FOR EXEMPTION FROM APPENDIX J, TYPE C LEAK TESTING OF THE CONTAINMENT AND RESIDUAL HEAT REMOVAL SPRAY SYSTEMS

SEQUOYAH NUCLEAR PLANT

UNIT 2

BACKGROUND INFORMATION

As part of NRC's Safety System Quality Evaluation (SSQE) performed on SQN's unit 1 containment spray (CS) system, it was decided that TVA did not meet the testing requirements for all valves associated with penetrations X48A, X48B, X49A, and X49B (CS and residual heat removal [RHR] spray, respectively). After further review of the SER and discussions with NRC representatives, TVA is requesting an exemption to 10 CFR 50, Appendix J, type C leak rate testing for the inboard containment isolation valves on RHR spray and CS penetrations 48A, 48B, 49A, and 49B.

RHR SPRAY AND CS SYSTEMS

After a pipe break inside the containment, the CS system is automatically actuated when the containment pressure exceeds 2.81 pounds per square inch gauge (psig). The normally closed, motor-operated valves automatically open; and the spray pumps are energized. The RHR spray system is a manually actuated system. The operator initiates this system if the containment pressure exceeds 9.5 psig and more than one hour has elapsed since the start of the accident. The RHR spray system was designed to supplement the CS system in the event that one train of containment spray was unavailable. Only one train of RHR spray is ever placed in service. Both spray systems continue to operate until the containment pressure drops below 2.8 psig, at which time they can be manually removed from service.

During the initial phase of the accident, the CS system takes suction from the refueling water storage tank (RWST). When the RWST reaches low-low level, the system is realigned to take suction from the containment sump. Because the RHR spray system is not put into operation before one hour after an accident, it only takes suction from the containment sump.

As a result of the importance to safety of their operation postaccident, both the RHR spray and the CS systems are TVA Class B systems. TVA Class B designation means that the valves and piping are American Society of Mechanical Engineers (ASME) Section III Class 2 or equivalent and Seismic Category I. Valves and piping procured before April 1973 are designed in accordance with American National Standards Institute (ANSI) Standard B 16.5 and 31.1 respectively, which are considered to be equivalent to Section III of the ASME code.

Containment isolation for the RHR spray and CS line penetrating the primary containment is provided by a check valve inside the containment and a normally closed, motor-operated valve located outside the containment. This arrangement meets the requirements of 10 CFR 50, Appendix A, general design criteria (GDC) 56. Individual leak rate testing of the check valves in these systems has not been performed. This was not done because the system is used after an accident to control containment pressure, and when the system is not in use, a water seal is maintained in the piping between the normally closed valves and the check valves. As a consequence, the system is not built in a

manner that permits local leak rate testing of the check valves. This can be seen in FSAR figure 6.2.2-2. The normally closed, motor-operated valves are leak tested in accordance with 10 CFR 50, Appendix J, for those penetrations in which through-line leakage is prevented using a seal system. These valves are leak rate tested to ensure that an adequate water inventory can be maintained for 30 days. In addition, the portions of these systems located outside the containment are considered to be closed systems because they do not communicate directly with the environment. Thus, any leakage past the isolation valves will be retained in the piping systems.

JUSTIFICATION FOR EXEMPTION

TVA requests an exemption to the requirements of Appendix J, type C leak rate testing for the check valves in accordance with 10 CFR 50.12(a)(2)(ii), 10 CFR 50.12(a)(2)(iv), and 10 CFR 50.12(a)(2)(vi) until the next scheduled refueling outage on SQN unit 2. The exemption is justified based on the following considerations:

1. If the CS system functions as designed, both trains will be in operation after an accident. While the system is in operation, no leakage of containment atmosphere will occur because the water flowing through the spray system is at a pressure greater than the peak containment pressure. When the spray system is no longer needed, the containment pressure is less than 8 psig, well below the peak accident pressure of 12 psig. The system will be water filled, and any leakage across either the check valve or the motor-operated valve will be retained in the closed system. The water head in the system is sufficient to prevent outleakage of containment atmosphere at these low pressures. For the case where both trains of containment spray operate, the RHR spray would not have been used; and the motor-operated valves in the RHR system would have remained closed. Thus, the water leg seal would have been maintained; and no leakage through penetrations X49A or X49B would have occurred.

2. For the case where one train of CS was inoperable because of failure of the motor-operated valve to open, the water leg seal would be maintained; and no leakage would occur from the inoperable line. The other train of CS and the train of RHR spray placed in service would be fully functional; and, when they were shut down later in the accident, the containment pressure would be less than 2.8 psig and the motor-operated valves would be closed. Thus, there would not be any leakage of the containment atmosphere outside the system, and there would not be any past the motor-operated valves.

3. For the case where one train of CS was inoperable because of failure of the pump to start, the motor-operated valve in that train would have been opened. The operator should close the motor-operated valve, but the water leg may be lost before the valve would be closed. Only in this case

would some leakage past the motor-operated valve be possible. Any leakage past the valve would be retained in the closed system outside the containment.

4. As can be seen from the above discussions, because only one train of RHR spray is placed in service because of a single failure of one train of CS, leakage of containment atmosphere past the motor-operated valves in this system will not occur.

5. The portion of these two systems outside containment is normally filled with water both before and after an accident. This water would act as a barrier to containment leakage. This is water between the RWST and the motor-operated valves.

6. The check valves that isolate the RWST from the CS and RHR systems when these systems are in the recirculation mode from the sump are functionally tested by performing a leak rate test on the CS system valves and the RHR valve. This test is done as part of the ASME Section XI in-service test requirements provided by technical specification 4.0.5. In addition to the check valves, each of these lines is equipped with a motor-operated valve that is also used to isolate these lines from the RWST. Both the CS system and the RHR system are monitored for excessive leakage in accordance with technical specification 6.8.5.a. The RWST isolation valves and the associated testing and system monitoring ensure that these systems qualify as closed systems outside the containment.

7. A similar exemption to leak rate testing isolation valves in the upper head injection (UHI) system at SQN was approved by the NRC by a letter from G. Zech to S. A. White dated January 15, 1988. The UHI system has containment isolation valves that could not be leak rate tested in accordance with 10 CFR 50, Appendix J. The UHI system is a TVA Class B system that is considered to be closed outside the containment. The basis for requesting an exemption for the CS and RHR spray containment isolation check valve is very similar to the basis used for obtaining the exemption from leak rate testing for the UHI isolation valves.

8. The addition of manual block valves in the CS and RHR spray lines necessary to perform a type C leak rate test on the check valves would result in increased capital cost to the plant and radiation exposure to workers. Most importantly, the addition of these valves would decrease the reliability of each system to perform its primary safety function of ensuring containment integrity by controlling the peak containment pressure.

9. Starting with the next refueling outage on unit 2, TVA is proposing to monitor the leakage of these valves during the regularly scheduled type A integrated containment leak rate test. The leak rate measured for these valves will be added to the type C test results as appropriate. TVA will also evaluate other options for ensuring the check valves are functioning properly.

ENVIRONMENTAL ASSESSMENT

Identification of Proposed Action: The exemption will permit the exclusion from type C leak rate testing the inboard containment isolation check valves in the CS and RHR spray systems. 10 CFR 50, Appendix J, requires the performance of leak rate testing of valves that serve as containment isolation valves. Type C testing cannot be performed because of the lack of manual or remote-manual block valves in the lines that are necessary to allow such testing. Therefore, an exemption is needed from Appendix J specifically for the type C testing of the inboard check valves.

The Need for the Proposed Action: The proposed exemption is needed to permit plant operation without being in violation of NRC's requirements.

Environmental Impact of the Proposed Action: The proposed exemption is from the testing requirements of Appendix J. This testing ensures that closed containment isolation valves will not leak excessively following an accident. The penetrations associated with the CS and RHR spray systems are protected from through-line leakage by an outboard isolation valve and a water seal. Additionally, the portions of the systems located outside containment are considered to be closed systems. Thus, any leakage past the isolation valves would be retained in the systems piping. Consequently, the radiological releases will not be greater than previously determined nor does the proposed exemption otherwise affect radiological plant effluents. Therefore, it is concluded that there are no significant radiological environmental impacts associated with this proposed exemption. With regard to potential nonradiological impacts, the proposed exemption does not affect nonradiological plant effluents and has no other environmental impact. Therefore, it is concluded that there are no significant nonradiological environmental impacts associated with the proposed exemption.

Alternative to the Proposed Action: The alternative to the proposed action would be to install manual or remote-manual block valves between the inboard check valves and the spray headers. This would result in increased capital costs to the plant and radiation exposure to workers. Most importantly, the addition of these valves could reduce system reliability.

Alternative Use of Resources: This action does not involve the use of resources not previously considered in connection with the "Final Environmental Statement Related to the Operation of Sequoyah Nuclear Plant, Units 1 and 2," dated July 1974.

SUMMARY

Based on the descriptions for the RHR spray and CS systems and the discussion of the bases for granting exemptions from 10 CFR 50, Appendix J, type C leak rate testing, it is our conclusion that the requested exemptions are authorized by law, will not present undue risk to the public health and safety, and are consistent with the common defense and security.