

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of	}	
TENNESSEE VALLEY AUTHORITY	}	Docket Nos. 50-327
(Sequoyah Nuclear Plant, Units 1 and 2)	}	50-328

EXEMPTION

I.

The Tennessee Valley Authority (the licensee) is the holder of Facility Operating Licenses No. DPR-77 and DPR-79 which authorize operation of the Sequoyah Nuclear Plant, Units 1 and 2, respectively. These licenses provide that, among other things, the facility is subject to all rules, regulations, and orders of the Commission now or hereafter in effect.

The Sequoyah facility consists of two pressurized water reactors located at the licensee's site in Hamilton County, Tennessee.

II.

One of the conditions of all operating licenses for water-cooled power reactors, as specified in 10 CFR 50.54(n), is that primary reactor containments shall meet the containment leakage test requirements set forth in 10 CFR Part 50 Appendix J. These test requirements provide for preoperational and periodic verification by tests of the leak-tight integrity of the primary reactor containment, and systems and components which penetrate containment of water-cooled power reactors, and establish the acceptance criteria for such tests. Specifically, Type C tests are intended to measure containment isolation valve leakage rates.

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A. Residual Heat Removal System

Containment isolation for the Sequoyah Residual Heat Removal (RHR) System injection lines into the reactor coolant system (RCS) consists of primary and secondary check valves on the three primary branch lines inside containment, a remote manual motor-operated valve outside containment on each of the two cold leg discharge lines (valves 63-93 and 63-94), and a remote manual motor-operated valve inside containment on the hot leg discharge line (valve 63-172). During the cold leg injection and recirculation phases, valves 63-93 and 63-94 are normally open to provide cooling flow to the core. Valve 63-172 is normally open during the hot leg recirculation phase. Both the primary and secondary check valves inside containment are leak tested with water as pressure isolation valves to a requirement of less than or equal to 1 gpm at a nominal RCS pressure of 2235 psig. The piping outside containment meets the requirements for a closed system outside containment as presented in section 6.2.4 of the Sequoyah Final Safety Analysis Report. Testing to verify integrity of this piping includes annual inspections in accordance with NUREG-0737 position III.D.1.1, in-service pressure testing in accordance with ASME Section XI, and quarterly ASME Section XI pump tests.

Remote manual motor-operated valves 63-93, 63-94 and 63-172 in the RHR System cannot be Type C tested according to the requirements set forth in 10 CFR part 50, Appendix J, in their present configuration. The RHR injection lines must be available to provide water to the core post-accident to prevent fuel damage. The addition of in-line block valves to permit leak rate testing in accordance with 10 CFR Part 50, Appendix J, would reduce the reliability

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reliability of these lines to perform their primary safety function following a LOCA. The staff concludes that the combination of water leakage tested primary and secondary check valves inside containment, a safety grade closed system into which leakage, if any, would flow, and inspection and testing to verify system integrity, provide an adequate basis to assure that the isolation valves in the PHR line will not be a source of leakage of containment atmosphere in the event of an accident, even though the valves are not tested in accordance with 10 CFR 50 Appendix J.

B. Upper Head Injection System

The Upper Head Injection (UHI) System at Sequoyah is normally filled with water from the accumulator up to the primary check valves going into the reactor head. Remote manual valves 87-21, 87-22, 87-23 and 87-24 are open during normal operation. When the RCS pressure falls below approximately 1200 psig, the UHI System begins to discharge into the reactor. When the accumulator reaches low level, valves 87-21, 87-22, 87-23 and 87-24 close. The remaining water level in the UHI water accumulator and the pressure acting upon this water head from the UHI gas accumulator act to provide a water seal on the outboard side of these valves. Any leakage of containment atmosphere through valves 87-21, 87-22, 87-23 or 87-24 into the UHI System volume would be contained by the closed, seismically qualified UHI system outside containment.

Valves 87-21, 87-22, 87-23 and 87-24 cannot be Type C tested according to the requirements set forth in 10 CFR Part 50, Appendix J, with the UHI System as currently configured. The licensee has requested an exemption from Appendix J Type C testing requirements. The staff concludes that the combination of a water seal resulting from the accumulator head and

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accumulator gas pressure, a safety grade closed system into which leakage, if any, would flow, and inspection and testing to verify system integrity, provide an adequate basis to assure that the isolation valves in the accumulator line will not be a source of leakage of containment atmosphere in the event of an accident, even though the valves are not tested in accordance with 10 CFR 50 Appendix J.

The licensee has also requested an exemption from the Type C testing requirements of Appendix J for the UHI line to the floor drain collector tank (containment isolation valves 87-10 and 87-11). TVA proposes to perform a Type C leak rate test of these two valves with the pressure applied in the opposite direction of the containment pressure that would be experienced as a result of a postulated event that would actuate the UHI System. The licensee stated that an exemption was warranted on the basis that its proposed test was equivalent to the Type C test and that further modification of the design was not cost effective.

The staff has reviewed the Appendix J exemption request for the floor drain collector tank line and concludes it is justified on the grounds that the potential leakage across the valves is greater in the reverse direction than in the accident pressure direction, and thus this provides an acceptable test for the valves. Therefore, the staff concludes that the exemption should be granted.

C. Pressure Relief Piping

Pressure relief is provided for the Safety Injection (SI) System, Chemical and Volume Control System (CVCS), and the Containment Spray System by means of vent lines running to a common line outside containment. The common line then

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passes through containment penetration X-24 and exhausts into the pressurizer relief tank inside containment. Containment isolation is accomplished by a single check valve in the common line inside containment, and by the pressure relief valve in each individual vent line. A water seal is provided on the check valve in the common line inside containment. Any throughline leakage that may occur through the pressure relief valves would be contained within a closed, seismically qualified system outside containment. In addition, the containment pressure would tend to further ensure that the check valve and pressure relief valves set tightly. The licensee has requested an exemption from the requirement to perform Type C leak rate testing on the common check valve and all nine relief valves associated with penetration X-24.

Type C leak rate testing presently cannot be performed for the valves in the line associated with penetration X-24 because there are no manual or remote-manual block valves in the line that would allow such testing of those relief valves. Furthermore, ASME section III, Class 2, NC-3677.3, states that there shall be no intervening stop valves between pressure relief valves and their relief points to ensure those lines cannot be inadvertently isolated.

The licensee has requested an exemption from the Appendix J Type C testing requirements for the common check valve and the nine relief valves associated with containment penetration X-24 on the basis that installation of block valves in the line that would allow such testing conflicts with the requirements of ASME Section III, Class 2, NC-3677.3. The staff has reviewed the licensee's request and concludes that an exemption from the Appendix J

Type C testing requirements for the pressure relief lines in the SI, CVCS, and Containment Spray Systems is justified on the basis that the isolation capability of the pressure relief line closed system with a water seal is a superior means of isolation and that modifications to permit testing may adversely affect system reliability.

III.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the exemptions are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security. The Commission has determined that special circumstances as provided in 10 CFR 50.12(a)(2)(ii) are presently justifying the exemption from Appendix J Type C testing for the RHR and UHI Systems--namely, that application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule which is to assure the valves and other penetrations of containment would not be a source of leakage of containment atmosphere into the environment in the event of an accident. The Commission further determines that special circumstances as provided in 10 CFR 50.12(a)(2)(i) are present justifying the exemption from Appendix J Type C testing requirements for the pressure relief piping in the SI, CVCS, and Containment Spray Systems--namely, that application of the regulation in the particular circumstances conflicts with other rules or requirements of the Commission. Specifically, application of the Appendix J Type C testing requirements conflicts with the requirements of ASME Code Section III, Class 2, NC-3677.3.

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The Commission hereby grants an exemption from the requirements of 10 CFR Part 50 Appendix J to the licensee for operation of the Sequoyah Nuclear Plant, Units 1 and 2, in that the RHR, UHI, and the pressure relief piping for the SI, CVCS and Containment Spray Systems can be acceptably isolated using the present configuration, as described in Section II above, in the event of a Design Basis Accident.


Pursuant to 10 CFR 51.32, the Commission has determined that the issuance of this exemption will have no significant impact on the environment (52 FR 9224, March 23, 1987).

For Further details with respect to this action, see the request for exemption dated December 31, 1986, which is available for public inspection at the Commission's Public Document Room, 1717 H Street, NW, Washington, D.C., and at the Chattanooga-Hamilton County Library, 1001 Broad Street, Chattanooga, Tennessee 37402.

This exemption is effective upon issuance.

Dated at Bethesda, Maryland, this 15th day of January 1988.

FOR THE NUCLEAR REGULATORY COMMISSION


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