UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
	)	
TENNESSEE VALLEY AUTHORITY	)	Docket No. 50-327
	)	Docket No. 50-328
(Sequoyah Nuclear Plant, Units 1 and 2)	)	

EXEMPTION

I.

The Tennessee Valley Authority (the licensee) is the holder of Facility Operating License Nos. DPR-77 and DPR-79 which authorize operation of the Sequoyah Nuclear Plant, Units 1 and 2, respectively. The 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(o), 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 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.

Containment isolation for the Sequoyah Containment Spray System (CSS) and Residual Heat Removal Spray System (RHRSS) spray lines penetrating containment, consists of a check valve (CV) inside containment and a normally closed motor operated valve (MOV) and sealed water system outside containment for each spray line. The sealed water system is a water leg maintained in each riser between each MOV and the spray CV. The containment isolation design for the CSS and RHRSS are discussed in Section 3.6.1 of the staff's Safety Evaluation Report (SER) on Sequoyah, NUREG-1232, Volume 2, dated May 1988. This NUREG was issued by the staff in its letter dated May 18, 1988.

Both the CSS and RHRSS have two independent spray lines. After a pipe break inside the containment, the CSS 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 spray flow is provided by the CSS pumps. The RHRSS is a manually actuated system which is used if containment pressure exceeds 9.5 psig with more than an hour elapsed since the start of the accident. The RHRSS supplements the CSS for spraying containment.

The current valve types and arrangements of the CSS and RHRSS meet the requirements of 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 56. Individual leak rate testing requirements for the CSS and RHRSS containment isolation valves, as stated above, are provided by 10 CFR Part 50, Appendix J. The typical Type C test for the CSS inboard containment isolation CVs (valves 72-547 and 72-548) and the RHRSS inboard containment isolation CVs (valves 72-555 and 72-556) cannot be performed according to the requirements set forth in 10 CFR Part 50, Appendix J. The Sequoyah Nuclear Plant, Units 1 and 2, designs do not provide a block valve downstream of each of the subject CVs before the spray rings. Therefore, the only method available to leak rate test these CVs is to pressurize the entire containment. Pressurizing the entire containment requires a specific configuration for the entire plant, and preparatory time to achieve that configuration requires an intensive effort over a 14 to 21 day time period. Furthermore, to satisfy the test frequency requirements of Appendix J, containment pressurization for leak testing the subject CVs would have to be performed no less frequently than once every 24 months and would, therefore, be impractical. Consequently, by submittal dated July 11, 1988, the licensee requested an exemption from the Type C leak testing requirements of 10 CFR Part 50, Appendix J for the subject CVs for Sequoyah Unit 2 only.

By submittal dated August 8, 1988, the licensee withdrew their July 11, 1988 exemption request and submitted the same exemption request for both Sequoyah Units 1 and 2 with revised justification. The licensee withdrew its proposed testing of the Unit 2 CVs during the regularly scheduled Type A integrated containment leak rate test and requested an exemption from any containment leak rate testing for the Units 1 and 2 CVs. The licensee provided an explanation of the impracticalities of leak rate testing these check valves including testing them during the Type A containment leak rate test. At the time the Sequoyah operating licenses were issued, containment isolation for the CSS and RHRSS lines penetrating the primary containments were provided by a CV inside the containment and a closed system outside the containment for each line. The MOV and sealed water system that is located outside the containment (one in each line) was not originally considered a containment isolation valve. As discussed in Section 3.6 of NUREG-1232, Volume 2, containment isolation for the CSS and RHRSS is provided by a CV inside containment and the normally closed MOV and sealed water system located outside the containment.

The licensee addressed the possible single failures in the CSS and RHRSS and concluded that the sealed system meets the criteria of Appendix J test pressure (Paragraph III.C.2) and acceptance criteria (Paragraph III.C.3) and that operability of the CVs is ensured for all conditions without leak rate testing the CVs. The licensee also addressed the impracticalities of leak rate testing the CVs. These impracticalities included the cost (including engineering design, planning construction, plant down time) to add block valves to the CV piping and the impact on the plant to add these CVs to the Type A containment leak rate test. The latter would require draining and then refilling the sealed water system and affecting the time to conduct the Type A test.

In order to ensure that no containment leakage could occur through these penetrations, a water seal is maintained between the outboard MOV and the CV in each line. The MOVs in both the CSS and RHRSS are leak rate tested every 18 months in accordance with paragraphs III.C.2 and III.C.3 of Appendix J. This is required by the Units 1 and 2 Technical Specifications for the CSS. The licensee, by its application dated August 10, 1988, has proposed these same requirements to be incorporated into the Units 1 and 2 Technical Specifications for the RHRSS. The leak test ensures that an adequate water inventory can be maintained for 30 days. To meet the requirements for a water seal in Appendix J, the seal pressure must be maintained at 1.1 Pa. This is 13.2 psig at Sequoyah, which corresponds to about 30 feet of water. The MOVs are located at elevation 714 feet. The water seal is in a vertical section of piping and is normally maintained at an elevation of approximately 830 feet. This provides a head of approximately 116 feet of water in each spray line. This portion of these systems, as stated above, is a closed system in that it does not communicate directly with the environment. Thus, any leakage past the CVs would be retained in the piping system of the CSS or RHRSS. Also, in the post-accident condition, these systems are water-filled and contain additional water seals as a result of the piping layout. The licensee has stated that assuming a worst case containment atmosphere with multiple failures where all pumps are not running and all valves fail open (including the subject CVs), the water leg in the CSS and RHRSS piping will be equal to the post-loss-of-coolant-accident (post-LOCA) water level inside the containment, which is above elevation 693 feet. This provides approximately 40 feet of head to prevent outleakage of containment atmosphere. Therefore, the staff concludes that testing of these valves provides no increase in safety because any leakage is precluded from reaching the environment by the water seal and in conjunction with the closed systems and MOVs outside containment, the design provides an acceptable alternative in achieving the underlying purpose of the rule and the exemption is warranted.

III.

Accordingly, the Commission has determined that, pursuant to 10 CFR 50.12, the exemption is authorized by law, will not present an undue risk to the public health and safety, and is 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 present, justifying the exemption from Appendix J, Type C testing for the CSS and RHRSS -- namely, that application of the regulation in the particular circumstances is not necessary to achieve the underlying purpose of the rule, which is to ensure 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, because, in addition to each MOV, there exists a water seal and a closed safety grade system outside containment for each spray line, thereby providing redundant isolation.

The Commission hereby grants the exemption from the requirements of 10 CFR Part 50, Appendix J for Type C testing to the licensee for operation of the Sequoyah Nuclear Plant, nits 1 and 2; in that the CSS and RHRSS 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 (53 FR 36926, September 22, 1988).

For further details with respect to this action, see the request for exemption dated July 11, 1988, superseded by letter dated August 8, 1988, which is available for public inspection at the Commission's Public Document Room, Gelman Building, 2120 L Street, N.W., Washington, D.C., and at the Chattanooga-Hamilton County Library, 1001 Broad Street, Chattanooga, Tennessee 37402.

This exemption is effective upon issuance.

Dated at Rockville, Maryland, this 22ndday of September, 1988.

FOR THE NUCLEAR REGULATORY COMMISSION

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