TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
500C Chestnut Street Tower II

JAN 18 1979

Director of Nuclear Reactor Regulation
Attention: Mr. S. A. Varga, Chief
Light Water Reactors Branch No. 4
Division of Project Management
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Varga:

In the Matter of the Application of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

Enclosed is the additional information concerning local leak rate testing at the Sequoyah Nuclear Plant requested by the Nuclear Regulatory Commission (NRC) Containment Systems Branch reviewer in a telephone conversation on January 10, 1979. The material specifies the basis for local leak rate testing of some containment isolation valves with water as the test medium. Amendment 60 to the Sequoyah Nuclear Plant Final Safety Analysis Report will incorporate the enclosed material.

Very truly yours,

J. M Mills

for J. E. Gilleland
Assistant Manager of Power

Enclosure (10)

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LOCAL LEAK RATE TESTING OF CONTAINMENT ISOLATION VALVES

Appendix J of 10CFR50, which specifies the integrated and local leakage rate testing requirements for containments, was published long after the construction of Sequoyah began and Sequoyah has not been required to conform to these requirements. The Sequoyah FSAR outlines TVA's present leak rate testing program for containment isolation valves. The test program permits the use of air or water as the test medium for local leak rate testing of isolation valves. Late this summer there were indications that the NRC may no longer accept water as a test medium for plants the vintage of Sequoyah. In October of this year TVA contacted the Regulatory Staff and requested clarification on this issue due to the potential impact on the Sequoyah startup date. The Staff verbally responded in telephone discussions that the use of air is required on all valves as specified in 10CFR50, Appendix J, except for cases of obvious hardship or justification which would show that the potential for release of containment atmosphere is small.

TVA has reviewed the piping layouts at Sequoyah to determine the specific plant design features and such modifications to the plant as would be required to permit local valve testing in conformance with Appendix J. The local valve test program considers 75 penetrations. Forty-four penetrations were scheduled to be tested with water instead of air. The remaining 31 penetrations would be tested with air as required by Appendix J. We determined from the system-by-system review of the 44 water test penetrations that 17 penetrations could and will be tested as required by Appendix J prior to initial plant operation. The remaining 27 water test penetrations were found to require hardware modifications which cannot be implemented without delaying the fuel load date of April 1979.

TVA therefore requests that leak rate testing with water of the isolation valves associated with these 27 penetrations be permitted for plant operation during the first fuel cycle. TVA will, during the first refueling outage, modify the plant so that all future local leak rate testing will be done in full compliance with Appendix J.

The problem with any modifications at this time is that plant preoperational testing (such as hot functional testing scheduled from January, 1979 through February) requires the proper function of many systems simultaneously to support any particular test. Some tests (such as the Type A containment leak test scheduled in February) preclude physical access to areas required to perform modifications. There are few time periods left between now and scheduled fuel loading when we have both physical access to certain equipment and freedom from its functional tie to other testing. These periods are already scheduled for intense testing activity that can only be done during such periods. Our every effort at this time is to direct our construction and testing program towards minimizing any further delays in the critical path schedule for fuel loading and plant operation. To alter the

for modifications at this time is certain to cause additional delay.

The attached table lists each of the systems and penetrations for which an exemption is requested. A brief discussion is provided for each system giving a basis for permitting the one-time-only water test. Factors discussed are procurement delays, system status, and design features which, in addition to the containment isolation provisions, would limit the release of radioactive material from the containment. TVA believes that plant and public safety are not compromised by permitting these few one-time water tests.

A one time exemption from the draining requirements of Appendix J for the Type A test is also requested for the penetrations provided in the attached table. These lines will be vented in accordance with the Type A procedures in Appendix J, however, the modifications required to perform the Type C test with air are also required in order to properly drain these lines for the Type A test.

System	Penetration Number	Modifications Required	Basis for a Water Test for First Fuel Cycle
Ice Condenser	X-47A	In-Line Block Valve & Drain Valve	Ice loading is presently underway. Modifications would require the system to be removed from service which would delay ice loading. Ice loading is a critical path item and any delays are translated directly to the fuel load date. Additionally, the in-line block valves cannot be procured prior to start-up of the plant.
	X-47B	In-Line Block Valve & Drain Valve	
	X-114	Drain Valve	
	X-115	Drain Valve	
UHI	X-110	2 Blind Flanges & 2 Vent Valves	Preoperational testing is presently underway on this system. The system would have to be removed from service to make modifications. This line has, in addition to the containment isolation valves, a manual normally closed Class E globe valve located outside containment in each branch of the line. Any leakage from this system would be treated by the Auxiliary Building Gas Treatment System (ABGTS) prior to release to the outdoors. The principal tests that could be delayed by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests
Demineralized Water	X-77	2 Drain Valves	System tests (non-critical) are scheduled for January 1979. The required modifications would delay putting this system in service. Portions of this system are located in the Auxiliary Building where any leakage across the isolation valves

System	Penetration Number	Modifications Required	Basis for a Water Test for First Fuel Cycle
			would be treated by the ABGTS. The principal tests that could be delayed by by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests
Component Cooling Water	X-29 X-52 X-35 X-53	Drain Valve Drain Valve Drain Valve & Cross Connect Drain Valve & Cross Connect	Preoperational testing has been completed for this system. The system would have to be removed from service to make modifications. This would delay the performance of other preoperational tests and thereby delay fuel loading. The Component Cooling Water System is a Class C, Seismic Category I closed loop piping system outside of containment. Any leakage across the isolation valves would be contained in the system piping and not released to the atmosphere. The principal tests that could be delayed by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests 3) CVCS Tests 4) Onsite Power Distribution Load Tests 5) RCP Tests
CVCS	X-15 X-44	In-Line Block Valve & 2 Drain Valves Drain Valve	Preoperational testing is presently underway on this system: The system would have to be removed from service to make modifications. Additionally, the CVCS is a Class E, Seismic Category I closed system outside of

System	Penetration Number	Modifications Required	Basis for a Water Test for First Fuel Cycle
			the primary containment. Any leakage across the isolation valves would be trapped in the system piping and not released to the atmosphere. The closed portions of this system are located in areas of the auxiliary building which are served by the ABGTS. The in-line block valve cannot be procured prior to fuel loading. The principal tests that could be delayed by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests 3) Onsite Power Distribution Load Tests 4) Full Flow Tests
A/C Chilled Water	X-64	Drain Valve	System testing (non-critical) is presently scheduled for late January 1979. Modification would delay testing and putting the system in service. This is a closed system inside containment located in the instrument room. The piping is ANSI B31.1 and Seismic Category I, therefore it is unlikely that a release of radioactivity would occur following a LOCA due to this system. The principal tests that could be delayed by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests
	X-65	Drain Valve	
	X-66	Drain Valve	
	X-67	Drain Valve	

System	Penetration Number	Modifications Required	Basis for a Water Test for First Fuel Cycle
Floors & Equipment Drains	X-41	Drain Valve	The preoperational test for this system is presently underway. Modifications would delay putting the system in service. This system is located in the Auxiliary Building and any leakage across the isolation valves would be treated by the ABGTS. The principal tests that could be delayed by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests
Primary Water	X-42	Drain Valve	Preoperational testing on this system is scheduled for December 1978. This test is a prerequisite to other tests required prior to startup. Modification of this system at this time would delay the performance of this test and therefore delay fuel loading. The principal tests that could be delayed by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests 3) CVCS Tests 4) Boron Recycle Test 5) Boric Acid Test
Fuel Pool Cooling	X-82	In-Line Block Valve	Preoperational testing on this system has been completed. The in-line block valve cannot be procured prior to fuel loading.

System	Penetration Number	Modifications Required	Basis for a Water Test for First Fuel Cycle
ERCW Supply	X-56	Drain Valve	Preoperational testing on this system is underway at the present time. Modifications would require that the system be removed from service. A functional ERCW system is a pre-requisite for the performance of many remaining preoperational and system tests. Fuel loading will incur a minimum of a day to day delay for time the ERCW is out of service. The ERCW is a Seismic Category I Class C system. There is a sufficient elevation difference in the piping outside of containment to maintain a 10 psig water leg seal in the supply lines after an accident. This water leg seal would limit the release of radioactive material which leaks past the isolation valves to a very small amount. The ERCW discharge lines are sealed with a seal system which meets the requirements of 10CFR50, Appendix J. The principal tests that could be delayed by requiring modification to this system are: 1) Containment Integrated Leak Rate Test 2) Hot Functional Tests 3) HVAC Tests 4) CVCS Tests 5) RHR Tests 6) Containment Spray Tests 7) SIS Tests 8) Onsite Power Distribution Load Tests 9) Component Cooling Water Tests 10) Control Bay HVAC Tests
	X-58	Drain Valve	
	X-60	Drain Valve	
	X-62	Drain Valve	
	X-68	Drain Valve	
	X-69	Drain Valve	
	X-74	Drain Valve	
	X-75	Drain Valve	

WATER LEAKAGE TO AIR LEAKAGE CONVERSION

In order to support our request for a one time water test on certain fluid lines at the Sequoyah Nuclear Plant, TVA is supplying water to air leakage conversion data. The data was developed for use at Unit 2 of the Browns Ferry Plant.

As part of our evaluation of converting isolation valve water leakage to gas equivalent, TVA empirically measured both air and water leakage through several typical valves. The purpose of this program was twofold. The first purpose was to reproduce the data presented in a technical report by Maine Yankee Atomic Power Company entitled "Water Leakage to Air Leakage Correlation." The second purpose of the program was to extend the Maine Yankee tests to cover a larger range of leakages and valve types. The range of leakages was to cover those typically encountered in a type C test program.

A comparison of the water and air leakage for those valves tested in the TVA program is depicted in Figure 1. Data from Maine Yankee is included for reference. There is reasonable agreement between the Maine Yankee and the data collected by TVA for the range of water leakage considered in the Maine Yankee report.

Figure 2 depicts the conversion curve presented in the Maine Yankee report and that obtained in these tests. The larger degree of scatter from the fit line for the TVA tests is attributable in part to the larger range of valve sizes tested.

The TVA curve presented in Figure 2 was used at Browns Ferry. This curve was based on tests conducted at 50 psig. The Sequoyah Type C test is performed at 12 psig. Therefore the curve should be corrected for the pressure difference. We intend to use the TVA curve (Figure 2) modified by multiplying the air leakage values by the square root of the pressure ratio between Sequoyah and Browns Ferry (i.e., $\sqrt{12/50}$) at Sequoyah. Appendix J uses this method of ratioing pressure to evaluate the leak rate for the Type A reduced pressure test. This water to air conversion method would be used only for the preoperational test.

FIGURE 1.

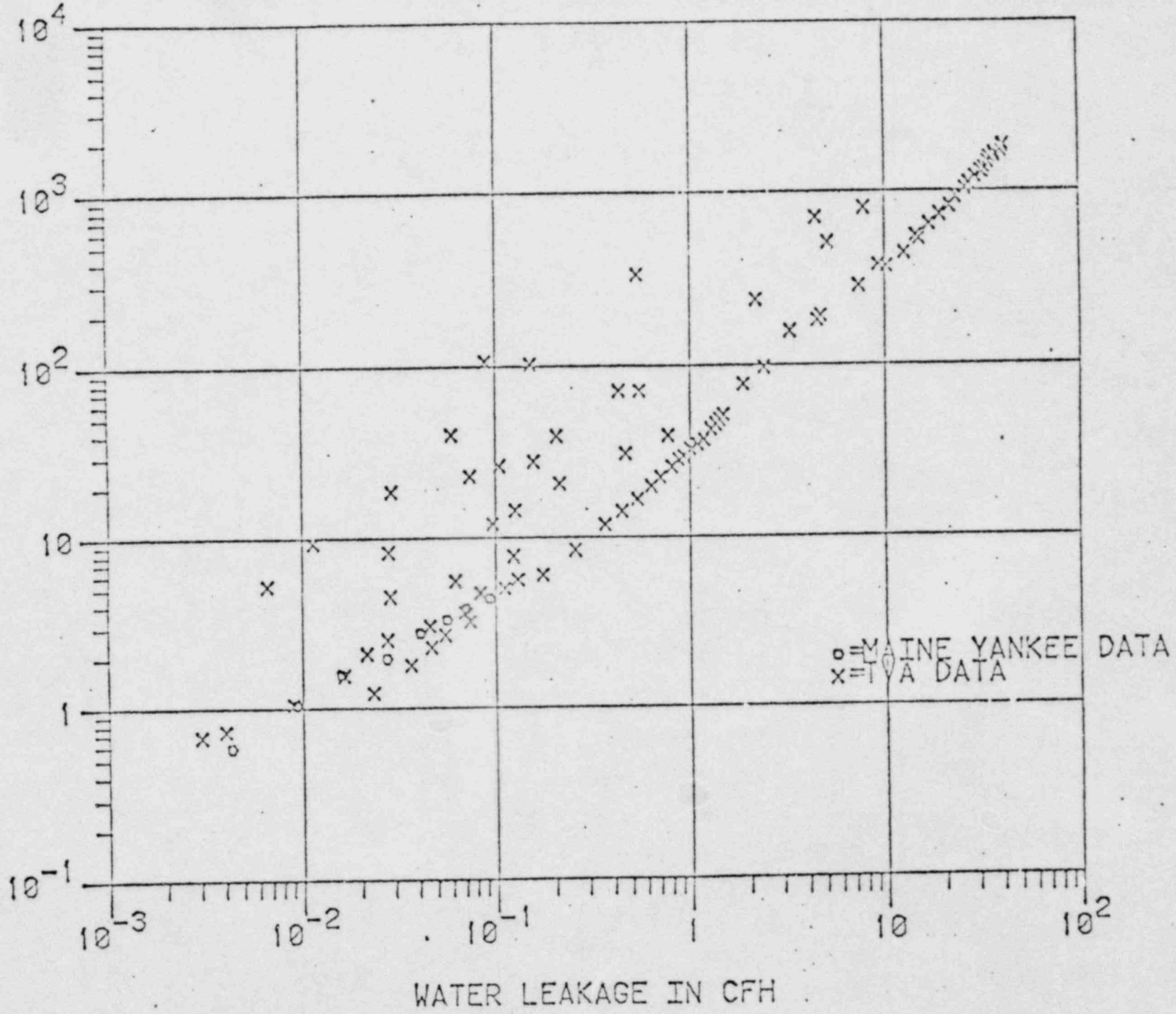

FIGURE 2.