UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

TERA

April 22, 1981

Docket No. 50-313

Mr. William Cavanaugh, III
Vice President, Generation
and Construction
Arkansas Power & Light Company
P. O. Box 551
Little Rock, Arkansas 72203

Dear Mr. Cavanaugh:

We have reviewed your proposed inservice testing (IST) program for Arkansas Nuclear One, Unit No. 1, as related to the testing of valves and as detailed in your letters dated June 18, 1977 and January 15, 1979. In order to complete our evaluation of your Inservice Testing Program for valves you are requested to provide additional information or propose physical modifications.

The enclosure identified the additional information or alternative and our requested schedules for submitting the information.

Sincerely,

John F. Stolz

John F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing

Enclosure:
Request for Additional
Information

cc w/enclosure:
See next page

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Arkansas Power & Light Company

cc w/enclosure(s):

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REQUEST FOR ADDITIONAL INFORMATION

RELATED TO THE INSERVICE TESTING OF VALVES

FOR

ARKANSAS NUCLEAR ONE, UNIT NO. 1

DOCKET NO. 50-313

1. Testing of Valves Which Perform a Pressure Isolation Function

There are several safety systems connected to the reactor coolant pressure boundary that have design pressures that are below the reactor coolant system operation pressure. There are redundant isolation valves within the Class 1 boundary, forming the interface between the high and low pressure systems to prevent the low pressure systems from being subjected to pressures which exceed their design limit. In this role, the valves are performing a pressure isolation function.

It is our view that the redundant isolation provided by these valves regarding their pressure isolation function is important to safety. We consider it necessary to provide assurance that the condition of each of these valves is adequate to maintain this redundant isolation and system integrity. For this reason we believe that some method, such as pressure monitoring, radiography, ultrasonic testing, or leak testing, should be used to assure that the condition of each valve is satisfactory to maintain this pressure isolation function.

We have identified the following valves as pressure isolation valves:

a) CF-1A, 1B (M-230, RCS/CFT)

b) DH-14A, 14B (M-230, RCS/L.P. Injection)

c) DH-13A, 13B (M-230, RCS/L.P. Injection)

d) MU-34A, B, C (M-230, RCS/H.P. Injection)

e) DH-17 (M-230, RCS/L.P.)

f) DH-18 (M-230, RCS/L.P. Injection)

g) CV-1228, 1227 (M-231, RCS/H.P. Injection)

h) CV-1219, 1220 (M-231, RCS/H.P. Injection)

i) CV-1050 (M-230, RCS/DHR)

j) CV-1410 (M-232, RCS/CHR)

k) DH-12, 16 (M-230, RCS/DHR)

We request that you propose a method to assure that each of the above valves will maintain the pressure isolation function and modify your IST programs accordingly, We request that you provide us an evaluation on a valve-by-valve bases of the details of the methods used to clearly demonstrate the conditions of each valve.

In the event that leak testing is selected as the appropriate procedure for achieving this objective we believe that the valves should be categorized as A or AC and leak tested in accordance with IWV-3420 of Section XI of the applicable edition of the ASME Code.

We also request your proposed schedule for testing each valve and modify your IST program accordingly.

We request your submittal satisfying the above requests within 90 days from receiving this letter.

2. Changes to the Technical Specification

In a November 1976 letter to the licensee, we provided an attachment entitled "NRC Guidelines for Excluding Exercising (Cycle) Tests of Certain Valves During Plant Operation." The attachment stated that when one train of a redundant system such as in the Emergency Core Cooling System (ECCS) is inoperable, nonredundant valves in the remaining train should not be cycled if their failure would cause a loss of total system function. For example, during power operation in some plants, there are stated minimum requirements for systems which allow certain limiting conditions for operation to exist at any one time and if the system is not restored to meet the requirements within the time period specified in a plant's Technical Specifications (T.S.), the reactor is required to be put in some other mode. Furthermore, prior to initiating repairs all valves and interlocks in the system that provide a duplicate function are required to be tested to demonstrate operability immediately and periodically thereafter during power operation. For such plants this situation could be contrary to the NRC guideline as stated in the document mentioned above.

We acknowledge receipt of your letter dated October 19, 1977 which proposed Technical Specifications (TSs) changes that would incorporate provisions of compliance with 10 CFR 50.55a. However, it does not appear that those proposed TSs accommodate our guidelines for including exercising tests of certain valves during plant operation.

We request that you review the current Technical Specifications (TS) and your proposed TS for ANO-1 and consider the need to propose TS changes which would have the effect of precluding such testing.

After making this review, if you determine that the TS should be changed because the guidelines are applicable, we request you submit proposed TS changes and describe the inoperable condition

for each system that is affected which demonstrates that the valve's failure would cause a loss of system function. Conversely, if you determined that the TS should not be changed because the guidelines are not applicable or cannot be followed, we request you submit the reasons which led you to this determination for each potentially affected section of the TS.

We request your submittal satisfying the above requests within 90 days from the receipt of this letter.

3. Valve Testing at Cold Shutdown

You proposed IST program does not discuss valve testing at cold shutdown. Our position on this issue is as follows:

Inservice valve testing at cold shutdown is acceptable when the following conditions are met: It is understood that the licensee is to commence testing within two hours after the cold shutdown condition is achieved but not later than 48 hours after shutdown and continue until complete or plant is ready to return to power. Completion of all valve testing is not a prerequisite to return to power. Any testing not completed at one cold shutdown should be performed during any subsequent cold shutdowns that may occur before refueling to meet the Code Specified testing frequency.

For planned cold shutdowns, where the licensee will complete all the valves identified in his IST program for testing in the cold shutdown mode, exception to the above 48-hour start time may be taken.

We request that you submit within 90 days from receipt of this letter a modification to your proposed IST program which would include our position on valve testing at cold shutdown.

4. Relief Requests

A. Reactor Coolant System

Category C Valves, Valves CF-1A & CF-1B

Subsection IWV-3520(a) of the Section XI Code requires these valves to be fully stroke exercised once every three months with exceptions as defined in IWV-3520(b). In the case of exceptions for a check valve the code permits the valves to be tested at cold shutdown where it is not practical to exercise the valves during power operation.

You have proposed to part stroke these valves at each refueling outage and request relief from code requirements.

Basis for Request for Relief From Code Requirements

CF-1A and CF-1B cannot be full- or part-stroke exercised every 3 months while the plant is in power operation. These check valves are not designed to be manually stroked, and can only be exercised by flow. Flowing during normal operation from the CFTs is not possible due to the fact that the differential pressure between the RCS (approximately 2250 psig) and the CFTs (approximately 600 psig) acts to maintain check valves DH-14A and DH-14B closed. These check valves are in series with CF-1A and CF-1B respectively, therefore preventing flow thru CF-1A and CF-1B from the CFTs.

Full-stroking of these valves during cold shutdown could subject the reactor coolant system to conditions exceeding pressure temperature limits and create as much as 28,000 gallons of liquid waste.

Evaluation

The Core Flood Discharge check valves CF-1A and CF-1B are valves that form part of a redundancy with check valves DH-14A and DH-14B respectively, whose function is to isolate the lower design pressure Core Flooding Tanks (CFTs) from the higher operating pressure Reactor Coolant System (RCS) during power plant operation. These valves automatically open during a large-break LOCA when the (RCS) pressure drops below approximately 600 psig and allows water from the CFTs to flood the reactor core.

Conclusion

We agree with you that the testing frequency required by code to be impractical. Also we agree with you that full stroke exercising these valves during operation or at cold shutdown is not possible with the present plant configuration. Therefore, we request you submit within 90 days from receipt of this letter supporting analyses which would justify granting of relief or propose modifications which would not require the granting of relief.

We consider the methods discussed in Appendix 1 acceptable for resolving this issue.

B. Reactor Building Spray System

Category C Valves, BS-4A & BS-4B

Subsection IWV-3520(a) of Section XI Code requires these check valves to be fully stroke exercised once every three months with exceptions as defined in IWV-3520(b). In the case of exceptions for these valves the code permits the valves be tested at cold shutdown where it is not practical to test the valves during power operation.

You have proposed not to test these valves at any time and you have requested relief from the code requirements.

Basis for Request for Relief From Code Requirements

These valves are upstream of the reactor building spray nozzles. Water cannot be used for stroking check valves because the system is open ended into the containment. Alternate test procedures require more manpower and equipment than is normally available during cold shutdown.

Evaluation

These valves are check valves in the redundant reactor building spray line inside the containment. Their functions are to isolate the containment from the environment and to open in the event the reactor building spray system is called upon to function. Our main concern is that they will not open and allow flow from the spray pumps.

Conclusion

We would agree that the testing frequency required by the code to be impractical. Also we would agree that full stroke exercising these valves during operation or at cold shutdown is not possible with the present plant configuration. Therefore, we request within 90 days from receipt of this letter that you submit supporting analyses which would justify granting of relief or propose modifications which would not require the granting of relief.

We consider the methods discussed in Appendix 1 acceptable for resolving this issue.

5. IST Program for Reactor Vessel Internal Check Valves

We discussed this matter with your staff on November 24, 1980, and they agreed to submit the IST program for the reactor vessel internal check valves. We request revised pages to your IST program which includes these valves within 90 days from receipt of this letter.

Methods Acceptable for resolving the proposed deviations from the Code with Respect to IST of Valves

1. The licensee performs the necessary plant modifications so that testing can be performed to meet the ASME Code.

2. Testing frequency may be at once every refueling outage provided the licensee can provide an acceptable basis for relief from testing at a higher frequency.

   An acceptable basis would be as described by (3) below.

3. For test intervals longer than code requirements or when the licensee's proposed method for exercising is a deviation from ASME code such as part-stroking vs. full stroking, the licensee should demonstrate by reliability analysis that when a valve (or several valves such as redundant valves) is exercised at the test intervals and methods proposed, the increase in the system unavailability is not significant. As part of this analysis, there should be a study to identify the random, cyclic, common cause, or systematic failure types or modes which may occur to the valve(s) over the longer-than-normal testing intervals. A study of data sources such as LERs and actual recorded plant data should then be performed to establish the type of failure the valve(s) experienced and the frequency of these failures for the same or similar applications. This "experience" failure rate should be factored into the reliability analysis. The data source for which the valves failure rates are derived should be justified. In the analysis, some use of reliability models or fault-tree methods may be used if deemed pertinent.