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

SAFETY EVALUATION BY

THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO OPERATION OF

ZION NUCLEAR POWER STATION UNIT NOS. 1 AND 2

COMMONWEALTH EDISON COMPANY

DOCKET NOS. 50-295 AND 50-304

A. BACKGROUND

By letters dated November 13, 1984 and January 4, 1985, Commonwealth Edison submitted Revisions 1 and 3 to the ten-year Inservice Inspection Programs for Zion Station Units 1 & 2. In accordance with 10 CFR 50.55a(g)(6)(i), the revisions and the supporting information will be evaluated to determine if the necessary findings can be made to grant relief from the requirements of the 1974 Edition through Summer 1975 Addenda of Section XI of the ASME Code.

B. RELIEF REQUESTS (REVISION 1)

1. Relief is requested from hydrostatically testing portions of the Class 1 & 2 systems listed below:

	Class
FCV-CS01 to CS0018	2
FCV-CS02 to CS0023	2
FCV-CS03 to CS0028	2
AOV-VC8169 to VC8352B	1,2
AOV-VC8147 to VC8279B	1,2
VC8393 to VC8392	1,2
VC0081 to 1A RCP	1,1
VC0082 to 1B RCP	1,2
VC0083 to 1C RCP	1,2
VC0084 to 1D RCP	1,2
VC-LCV112D&E to VC8546	2
MOV-VC8110 to VC8479B	1,2
MOV-RH8703 to RH8949A	1,2

MOV-RH8703 to RH8949B	1,2
SI8800A to SI8900A	1
SI8800B to SI8900B	1
SI8800C to SI8900C	1
SI8800D to SI8900D	1
MOV-SI8802 to SI9001A,B	1,2
MOV-SI8802 to SI9001C,D	1,2
MOV-SI9011A to SI8949C,D	1,2
MOV-SI9011A to RH8949A,B	1,2
MOV-SI8806 to SI8926	2
AOV-SI8883 to SI8912	2
MOV-SI8808C to SI8948C	1,2
MOV-SI8808B to SI8948B	1,2
MOV-SI8808D to SI8948D	1,2
MOV-SI8808A to SI8948A	1,2
MOV-SI8809A to SI9001A	1,2
MOV-SI8809A to SI9001B	1,2
MOV-SI8809B to SI9001C	1,2
MOV-SI8809B to SI9001D	1,1
MOV-SI8812A to SI8958	2
MOV-SI8812A to MOV-SI8812B	2

Code Requirements

Pressure retaining components shall be subject to the hydrostatic testing requirements as defined by subarticles IWB-5220 and IWC-5220 at or near the end of each inspection interval.

LICENSEE'S BASES FOR REQUESTING RELIEF AND ALTERNATE TESTING PROPOSED

The portions of piping FCV-CS01, CS02 and CS03 to CS0018, 23, 28 are unisolable from the RWST, which is an atmospheric tank. Therefore, the highest pressure it can see during a normal operating performance test is atmospheric pressure.

AOV VC8169 to VC 8352B*, AOV-VC8147 to VC8279B** and VC8393 to VC8392 are portions of piping that are not isolable from the reactor coolant system if hydrostatic pressure is applied. In addition, the hydrostatic pressure

* incorrectly identified as 8152A in June 27, 1983 submittal

** incorrectly identified as 8379A in June 27, 1983 submittal

required for this Class 2 system is above the reactor coolant system hydrostatic pressure. Therefore, these portions cannot be hydrostatically tested to the Class 2 pressure, but can be hydrostatically tested to a Class 1 hydrostatic pressure. Although reactor coolant hydrostatic pressure is only 45 psig above normal operation (1.02 Po = 2280), it was requested to be examined at normal operating pressure (2235 psig).

Upon further consideration, VC 0081, 82, 83, 84 to A, B, C, D, RCP flanges can be tested to Class 2 hydrostatic pressure, but only to the RCP flanges. It is the Station's position not to pressurize the reactor coolant pump seals during this hydrostatic test. The pump manufacturer has concurred with this position. Pressurizing the RCP seals to Class 2 hydrostatic pressure during cold shutdown, the only time it can be tested, could misalign the seal and subsequently damage it.

The portions of piping between VC 8546 and MOV-VC-LCV 112D and E are open to the RWST upstream and isolated from the Volume Control System pressure downstream. The highest test pressure this portion of piping will see is full RWST Level.

The portion of piping between MOV-VC-8110 and VC 8479B can be hydrostatically tested to Class 2 pressure for piping specification "E" because there are no available pipe tap connections in this portion of piping. In addition, the downstream piping is of a lower design pressure and the upstream piping would require a blank flange on the discharge side of one charging pump. There is insufficient clearance to install a blank flange. The blank flange protects the lower design pressure suction side of the pump. Therefore, the maximum pressure would be during normal operation with MOV-VC 8110 closed.

MOV RH 8703 to RH 8949A and B can be hydrostatically tested to Class 1 pressure, but the Class 2 portion can not be hydrostatically tested to its required pressure since it is unisolable from the reactor coolant Class 1 system. Therefore, these portions can all be tested to Class 1 hydrostatic pressure. Since the reactor coolant Class 1 pressure is only 45 psig above normal operating, the relief was requested to examine the lines during normal operating conditions.

In order to hydrotest the portions of piping between SI8800 A, B, C, & D to SI8900 A, B, C, & D, it would require charging to be diverted through the Boron Injection Tank bypass line to reach this piping. Charging this way would expose the injection nozzles to cold charging water, thus thermally cycling these nozzles. It is considered poor engineering judgment to cycle these nozzles since they only have a 60 cycle life. In addition, the discharge BIT motor-operated valves are not designed to hold pressure in the reverse direction, hence during a hydro, dilution of the BIT would occur.

MOV-SI 8802 to SI9001A, B, C, & D, and MOV-SI 9011B to SI8949 C & D, and MOV-SI 9011A to RH8949A & B are portions of piping that are not isolable from the reactor coolant system if hydrostatic pressure is applied. The hydrostatic pressure required for the Class 2 system is above the reactor coolant system pressure. The manual throttle valves are tac welded and bracketed in the open position as committed by Zion Station to the NRC to conform with Technical Specification 4.8.4 and cannot supply isolation for hydrostatic pressure tests. Therefore these portions cannot be tested to the Class 2 pressure, but can be hydrostatically tested to the reactor coolant Class 1 hydrostatic pressure along with the Class 1 portion of this attachment.

Although the reactor coolant hydrostatic pressure is only 45 psig over normal operating pressure, the relief was requested to examine at normal operating pressure.

The portion of piping between MOV-SI 8806 and SI 8926 is open to the RWST upstream and isolated from the volume control system pressure downstream. The highest pressure this portion of piping could see is full RWST Level.

The portion of piping between AOV-SI 8883 to SI 8912* cannot be tested to the Class 2 required pressure since the upstream piping is of a lower design pressure rating and the downstream side is isolated by the SI 8912 check valve. The highest pressure this portion of piping could see is during normal operations.

MOV-SI 8808A, B, C, & D to SI 8948A, B, C, and D are portions of piping that are not isolable from the reactor coolant system if hydrostatic pressure is applied. The hydrostatic pressure required for the Class 2 system is above the reactor coolant Class 1 hydrostatic pressure; therefore, these portions can not be tested to Class 2 hydrostatic pressure but can be tested to the reactor coolant Class 1 hydrostatic pressure along with the Class 1 portion. Although the reactor coolant hydrostatic pressure is only 45 psig over normal operating pressure, the relief was requested to examine it at normal operating pressures.

MOV-SI 8809A and B to SI 9001A, B, C, & D are portions of piping that are not isolable from the reactor coolant system if hydrostatic pressure is applied. The hydrostatic pressure required for the Class 2 system is above the reactor coolant Class 1 hydrostatic pressure. Therefore the

* incorrectly identified as 8913 in June 27, 1983 submittal.

Class 2 portion can only be tested to Class 1 hydrostatic pressure except between MOV-SI 8809A and B and SI 8957A and B. There are no pressure taps between MOV-SI 8809A and B and SI 8957A and B. The upstream piping is a lower piping design rating and the downstream piping are isolated by the check valves. The rest of the Class 2 and the Class 1 piping can be pressurized to reactor coolant Class 1 hydrostatic pressure, but since that pressure is only 45 psig above normal operating, the relief was requested to do it at normal operating pressure.

MOV-8812A to SI 8958 is a portion of piping that is isolated from the residual heat removal system by SI 8958 check valve downstream and limited by a lower design pressure of piping upstream. The highest pressure this portion of piping will see is full RWST level.

MOV-8812A to MOV-8812B is a portion of piping that is isolated from the residual heat removal system by SI 8958 check valve downstream and is open to the RWST after MOV SI 8812B with no pressure tap in between. The highest pressure this portion of piping could see is full RWST Level.

It is the Station's position that the systems not be modified or check valves removed to perform hydrostatic testing. Specifically, any additions of pressure tap sights or removal of check valves is considered undue hardship on the station.

STAFF EVALUATION AND CONCLUSIONS

The staff has determined that the requests submitted by the licensee involve Section XI Code requirements that are impractical to perform at Zion Station Units 1 & 2. The staff has also determined that the information supporting the requests establishes the impracticality of the Code requirements and that the

alternative tests proposed by the licensee are equivalent to these required by the Code and therefore will satisfactorily demonstrate structural integrity of the piping and components. The staff therefore concludes that relief from the requirements may be granted as requested by the licensee with the alternative tests and examinations substituted for those required by the Code.

2. Relief is requested from hydrostatic testing portions of the Class III systems between the valves listed below:

CC-0117-to CC-9441
CC-0006 to CC-9454

Code Requirement

Pressure retaining components shall be subject to the hydrostatic testing requirements as defined by IWD-5200 at or near the end of the inspection interval.

LICENSEE'S BASIS FOR REQUESTING RELIEF AND ALTERNATIVE TESTING PROPOSED

As an alternative, the testing for evidence of leakage shall be performed on these portions of the systems listed above, at their nominal operating pressures in accordance with paragraph IWD-5222, 1980 Edition. Hydrostatically testing these portions of the Class III system is restricted due to the limiting design configurations of the pumps, piping and valves. Additionally, hydrostatically testing the CC Surge Tank fill lines could result in contamination of the station's pure water systems with chromates from the Surge Tanks. This alternative will provide the desired results if leakage is present when this testing is performed for the inspection interval.

STAFF EVALUATION AND CONCLUSIONS

The staff finds the hydrostatic test requirements for the portions of piping listed above impractical to perform because of the systems design and the possibility of resulting contamination of the pure water systems if the requirements were imposed. The staff also determined that the alternative test proposed by the licensee is equivalent to the one required by the Code and therefore will adequately demonstrate the structural integrity of the piping and components. We therefore conclude that relief from the requirements may be granted with the alternative test being performed in lieu of the Code requirements.

3. Relief is requested from hydrostatic testing portions of the Class III system between the valves and pumps listed below:

CC9495A and RCP "A"
CC9495B and RCP "B"
CC9495C and RCP "C"
CC9495D and RCP "D"

Code Requirement

Pressure retaining components shall be subject to the hydrostatic testing requirements as defined by IWD-5200 at or near the end of the inspection interval.

LICENSEE'S BASIS FOR REQUESTING RELIEF AND ALTERNATE TESTING PROPOSED

Specifically, the required pressure for this piping is 3000 psig. The thermal barrier inside the pump has a design differential pressure of 200 psi. Reactor coolant is on one side and component cooling on the other side of the thermal barrier. In order to pressurize the component cooling to 3000 psig the reactor coolant must be at least 2801 psig. At 2801 psi the reactor coolant pumps can not have the thermal barrier isolated from the pumps cooling source of component cooling. In addition the connecting

flanges can not be moved enough to pressurize the 1 foot of pipe and check valve to the required pressure. Therefore as an alternative the thermal barrier and attached piping will be pressurized to 187.5 psig with the rest of the component cooling system.

STAFF EVALUATION AND CONCLUSIONS

The Code hydrostatic test pressure requirement for the sections of piping listed is impractical because of the system desig To impose the requirement could result in damage to the reactor coolant pumps. The staff has determined that the alternative testing method proposed by the licensee is equivalent to the one required by the Code and therefore it will adequately test structural integrity of the piping. The staff concludes that relief from the Code test pressure requirement may be granted as requested.

C. Relief Request (Revision 3)

Relief is requested to defer the system hydrostatic pressure test on a portion of the auxiliary feedwater system from the auxiliary feedwater pumps (1A, 1B, and 1C) to 1MOV-FW0050, 51, 52, 53, 54, 55, 56, 57 until the next Unit 1 refueling outage following receipt of replacement isolation boundary valves.

Code Requirements

IWD-5000

The pressure retaining components within the Class III boundary are subject to the hydrostatic test requirements of IWD-5000 each inspection interval.

Basis for Relief

By letter from S. A. Varga to D. L. Farrar, dated December 24, 1984, NRC granted relief for completion of Zion's Unit 1 first ten-year interval inservice inspection program until the next refueling outage, currently scheduled to start about January 24, 1985. Due to excessive leakage past the seats of the auxiliary feedwater system hydrostatic boundary isolation valves, valve replacement will be required prior to test performance.

Zion's original design for the auxiliary feedwater system had air operated valves (AOV) for controlling the auxiliary feedwater flow. Due to safety concerns, Zion disconnected the air lines to these AOVs, failing open the valves, and used the motor operated valves (MOV) downstream of the AOVs to throttle and control the auxiliary feedwater flow. Because these MOVs were not specifically designed for throttling, after many years the valves' seats eroded. This was confirmed during periodic operation of the pumps when flow gauges indicated flow past the MOVs even though the valves were closed. The valves' locations did not permit easy repair, but Zion did disassemble a few valves and found the seat area eroded beyond repair. The Station initated an auxiliary feedwater system modification in October, 1983 so the MOVs would be more accessible for maintenance and have throttling capabilities. The modification requires an extensive outage due to the time frame required with the auxiliary feedwater system out of service; it is, therefore, scheduled for installation during a refueling outage.

Zion must delay the hydrostatic test for the auxiliary feedwater discharge piping until the new MOVs are installed because the existing MOVs cannot hold the test pressure. Purchase of the new valves is being handled on an expedited basis, however, the manufacturer cannot supply the new MOVs in time for installation during the upcoming outage for Unit 1 (estimated delivery

date May 15, 1985). Zion will hydrostatically test the discharge piping after the new MOVs are installed. The AOVs cannot be used as a pressure boundary since they have not been used in ten years and some of their components have been removed from the valves making them inoperable.

More than half of the required hydrostatic pressure testing has been completed with no serious deficiencies identified. All remaining hydrostatic pressure tests are to be completed during the upcoming refueling outage with the exception of the one test for which relief is requested by this submittal.

This matter has received station On-Site and Off-Site reviews. Based on the above, it has been determined that deferral of the auxiliary feedwater system hydrostatic test will have no significant effect upon the probability or consequences of an accident or upon the health and safety of the public.

STAFF EVALUATION AND CONCLUSIONS

The eroded seats of the valves used to isolate portions of the auxiliary feedwater system prevent the licensee from performing the Code required hydrostatic test until replacement valves have been installed. The licensee has requested to delay the test until that time, approximately five to six months after that required by Section XI and the extension granted by the NRC by letter dated December 24, 1984. Hydrostatic tests performed on other portions of the system should provide some indication of the general condition of that portion for which the deferred test has been requested. Based on this and the relatively short period of time past that required by Code, the staff concludes that the relief may be granted.

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