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1CAN108204

Director of Nuclear Reactor Regulation
ATTN: Mr. J. F. Stolz, Chief
Operating Reactors Branch #4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
NRC Recommendations on the
ANO-1 Emergency Feedwater System

Gentlemen:

Your letter of June 18, 1982, (1CNA068202) addressed several open items concerning the Emergency Feedwater (EFW) system. We submitted a partial response on July 22, 1982 (1CAN078208). Attached you will find the rest of our responses in the same format as the recommendations.

Very truly yours,

John R. Marshall

John R. Marshall
Manager, Licensing

JRM:MCS:sc

Attachment

A001

Attachment 1

Response to NRC Concerns on ANO-1
Emergency Feedwater Upgrade

Enclosure 1

1. "Recommendations GS-5 - We require that the licensee state whether the capability exists at ANO-1 to operate one EFW train without A.C. power for at least two hours, and whether adequate lighting and communications are available at the local station independent of A.C. power."

   Response: This item was addressed in our July 22, 1982 response.

2. "Recommendation GS-6 - We require the licensee to commit to inclusion of a flow test verifying the flow path of one EFW train after a prolonged shutdown in the ANO-1 surveillance requirements."

   Response: Current ANO-1 Technical Specifications require a functional test every 18 months by actually feeding the OTSG as previously acknowledged. The test frequency is set to accomodate refueling cycles and is typically performed prior to restart from a refueling outage. The system flow path up to the last MOV isolating the OTSG is verified by the monthly surveillance as required by current Technical Specifications. This MOV is cycled periodically and the stroke time recorded under the present surveillance procedures. No manual valves exist in the unverified flow path. The testing scheme currently existing in our Technical Specifications is consistent with the approach used on other plant safety systems such as the HPSI, LPSI and containment spray. It is not apparent that adoption of such a flow test at every cold shutdown would significantly enhance assurrances of system availability over these measures currently in place.

   Such a test, however, does cause the addition of heavily oxygenated water into the OTSG's, which is a deleterious situation that should be avoided where not absolutely required in order to best maintain OTSG tube integrity.

3. "Recommendations GL-2 and GL-4 - We require that in the event of loss of normal EFW pump suction pressure the licensee provide automatic switchover to the service water system with a response time compatible with pump protection requirements."

   Response: The response to this item was included in our July 22, 1982 response.

4. "Recommendation GL-3 - We require that the licensee incorporate surveillance requirements for the EFW turbine steam admission valves' 2666, 2667 and 2617 positions in the ANO-1 Technical Specifications."

Response: Motor operated valves CV-2666, 2667 and 2617 are currently covered and will continue to be covered after EFW upgrade completion by ANO-1 Technical Specifications. The position of these valves is verified both by indication and locally during the monthly test specified by sections 4.8.1.a.1 and 4.8.1.b.

5. "Concerning Additional Recommendations - Item B-1 - The licensee should clarify that the pressure sensing instrument on the EFW pump suction line is available to provide backup CST level alarm to the actual CST level instrument and alarm when a tank volume equivalent to at least two hours of EFW supply is available."

Response: The present Condensate Storage Tank (CST) level instrumentation consists of a non Class 1E tank level switch alarm (with local indication of tank level) to the control room annunciator that alarms when two hours of EFW supply remains. In addition, a Class 1E, seismically mounted, pressure switch is provided for the EFW pump suction piping. This switch is intended to alarm on the control room annunciator when at maximum flow, two hours of EFW supply is available. We are currently reviewing this setpoint and will make any changes indicated as necessary by this review. Although the control room annunciators are not Class 1E, they are backed with DC power.

The proposed EFW Upgrade includes replacement of the tank level switch alarm with a non-Class 1E level transmitter that will send a signal to a control room level indicator. The level indicator will provide a low CST level alarm contact to the control room annunciator. No changes are envisioned at this time for the low suction pressure alarms.

Enclosure 2

1. "Recommendation GL-6 - Additional environmental qualification information is required regarding the effect of high energy line breaks on the operability of the EFW system."

Response: The environmental conditions within the EFW Pump Room (Room 38) following the postulated event (main feedwater line break) remain mild. Referencing the ANO-1 environmental qualification submittal dated October 2, 1981, (1CAN108101) Room 38 experiences the following environmental parameters immediately following the postulated line break:

Maximum Temperature = 136°F
Maximum Pressure = 0.7 PSIG
Maximum Total Integrated Dose = 1.1×10^3 Rads
Maximum Humidity = 100%

These parameters are not severe enough to be considered a harsh environment as defined by the referenced submittal. Therefore, electrical equipment located inside Room 38 including the EFW Pump Motor need not be environmentally qualified to a harsh environment.

Enclosure 3

1. "The licensee should provide information on whether the system design will limit the flow to one steam generator to the maximum allowable value of 1170 gpm in the event of actuation of an isolation signal to the other steam generator when both EFW pumps are in operation, or provide controls or administrative measures to maintain this limit."

   Response: The five ft/sec cross flow velocity limit is based on avoiding stimulation of harmonic vibration in the steam generator tubes. A conservative calculation based on experimental data indicates that the critical cross flow velocity is greater than five ft/sec for all B&W steam generator designs. With six active EFW nozzles per steam generator five ft/sec corresponds to an EFW flow of 1170 gpm. A calculation using the ANO-1 external auxiliary feedwater header design indicates that a critical cross flow velocity will not occur at less than 1500 gpm.

   EFW flow rate of $\geq$ 1500 gpm would result in a rapid RCS cooldown. Automatic action and operator response to limit cooldown rates would prevent continued operation at critical flows. We feel this provides adequate margin against tube failures from sustained harmonic vibration induced by EFW cross flow velocity.

2. "The licensee should verify by analysis that, if a steam generator level of 31 feet is required to mitigate the effects of postulated accidents, the operator has sufficient time and access to perform the necessary manual actions at the EFW control station and the EFW cabinets."

   Response: This item was addressed in our July 22, 1982 response.