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U. S. Nuclear Regulatory Commission
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SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Licensee Event Report No. 50-313/90-013-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(ii), attached is the subject report concerning the location of safety related Service Water piping in close proximity to a high energy Main Feedwater line as a result of inadequate design interface which created the possibility of a failure of the Service Water System.

Very truly yours,

James D. Fisicaro
for RJK

James J. Fisicaro
Manager, Licensing

JJF/RHS/mmg
Attachment
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NRC Form 366
Commission
(6-89)

U.S. Nuclear Regulatory

Approved OMB No. 3150-0104
Expires: 4/30/92

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4) Location of Safety Related Service Water Piping in Close Proximity to a High Energy Main Feedwater Line as a Result of Inadequate Design Interface Created the Possibility of a Failure of Both Loops of the Service Water System

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
Month	Day	Year	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Names	Docket Number(s)
									ANO-2	0 5 0 0 0 3 6 8
1 0	2 6	9 0	9 0	0 1 3	0 0	1 1	2 6	9 0		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)					
	N						
POWER LEVEL (10)	0 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)		
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)		
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify in		
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	Abstract below and		
		20.405(a)(1)(iv)	X 50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	in Text, NRC Form		
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	366A)		

LICENSEE CONTACT FOR THIS LER (12)

Name	Telephone Number
	Area Code
R. H. Scheide, Nuclear Safety and Licensing Specialist	5 0 1 9 6 4 - 5 0 0 0

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

Cause	System	Component	Manufacturer	Reportable to NPRDS		Cause	System	Component	Manufacturer	Reportable to NPRDS	

SUPPLEMENT REPORT EXPECTED (14)	EXPECTED SUBMISSION DATE (15)	Month	Day	Year
[ ] Yes (If yes, complete Expected Submission Date) [X] No				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On October 26, 1990, during the performance of a walkdown of the ANO-1 Service Water System (SW), it was determined that safety related SW return piping was located in close proximity to the Main Feedwater (MFW) line from the "A" train MFW pump. A high energy line break (hELB) of the MFW piping could cause a breach in the SW piping which would create a leak path from the S. common return header to the turbine auxiliary building. Although a break in the SW piping at this location would not cause a significant decrease in system backpressure, a concurrent loss of Lake Dardanelle would compromise the operability of the SW system. The necessity of using the Emergency Cooling Pond (ECP) as the SW supply could result in the inoperability of the SW systems of both units due to loss of ECP inventory through the breached return header. The most probable cause of this condition was an inadequate design interface during the HELB evaluations. The SW return head.. pressure boundary check valve (SW-9) was relocated below a floor slab to provide a Seismic Category I wall separation between the MFW line and the safety related SW piping. The remainder of the ANO-1 SW common return header was evaluated for HELB interaction. Also, the ANO-2 SW piping will be walked down during the next refueling outage.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

A. Plant Status

At the time of discovery of this condition, Arkansas Nuclear One, Unit One (ANO-1) was in a refueling outage (1R9) with the reactor vessel defueled. Unit Two (ANO-2) was operating at approximately 100 percent of rated power.

B. Event Description

On October 26, 1990, during the performance of a walkdown of the ANO-1 Service Water System (SW) [BI] in response to Generic Letter 89-13, ANO personnel determined that safety related SW common return header piping from the Intermediate Cooling Water (ICW) heat exchangers (E28A, B, C) was located in close proximity to the Main Feedwater (MFW) [SJ] line from the "A" train MFW pump to the 1A high pressure feedwater heater.

The ANO-1 Safety Analysis Report (SAR) states that the MFW piping upstream of and surrounding the high pressure heaters is designed as non-Seismic Category I and that breaks may be assumed to occur anywhere along the pipe. The SAR also states that this piping is located in the non-Category I section of the turbine auxiliary building and is separated from safety related equipment by at least one Seismic Category I wall. However, no piping restraints or pipe impingement protection was evident for the SW common return header piping which was located close to the MFW line, and no intervening walls were present.

ANO determined that a high energy line break (HELB) of the MFW piping in the vicinity of check valve SW-9 could cause an unisolable breach in the piping downstream of the valve which would create a leak path from the SW common return header to the turbine auxiliary building. Check valve SW-9 is the pressure boundary of the SW common return header and is located near the seismic boundary. ANO concluded that a break in the SW piping at this location would not cause a decrease in system backpressure significant enough to render the system incapable of performing its design function. However, if the initiating event is considered to be a break of the MFW line causing a failure of the SW piping downstream of SW-9, and the single failure is considered to be a mechanistic failure of the Dardanelle Dam locks resulting in the loss of Lake Dardanelle as the SW supply, the operability of the SW system would be compromised. The necessity of using the Emergency Cooling Pond (ECP) as the SW supply could eventually result in the inoperability of the SW systems of both units due to loss of ECP inventory via backflow through the breached SW return piping.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

C. Root Cause

HELB considerations were added to Appendix A of the ANO-1 SAR in June, 1973, after the SW system was installed. It is obvious from statements made in the SAR that an HELB evaluation was completed showing the necessity to install all safety related equipment away from the MFW line. The SAR states that safety related equipment in the area is separated from the MFW line by at least one Seismic Category I wall. However, check valve SW-9 and its downstream piping was apparently overlooked during this evaluation. Therefore, the most probable cause of this condition was an inadequate design interface during the HELB evaluations.

D. Corrective Actions

A design change was initiated and check valve SW-9 was relocated to a position below the Seismic Category I floor slab at elevation 354'0". This new location provides a Seismic Category I wall separation between the MFW line and SW-9 and its downstream piping, as specified in the SAR and also provides protection from adverse seismic interactions.

The ANO-1 SW common return header has been evaluated for HELB interaction via the walkdown conducted in response to Generic Letter 89-13. For the common return header proper, no high energy lines are located in the vicinity such that a HELB event could cause a failure of both loops of the SW syst The balance of the return header is located in hallways with surrounding wa ls floors and ceilings providing barriers, where necessary, from high energy piping.

Walkdowns of the ANO-2 service water piping in response to Generic Letter 89-13 will be undertaken during the 2R8 outage; these walkdowns will include determination and disposition of potential HELB interactions. In addition, it is planned to perform a sampling of potential HELB interactions in other safety systems of both units to ensure that this was an isolated condition. This sampling is expected to be completed by April 1, 1991.

E. Safety Significance

The location of the SW return header piping in close proximity to the MFW line such that a HELB could cause a common mode failure of both loops of the SW system is safety significant. However, the postulated scenario in which the MFW line in the vicinity of SW-9 (original location) ruptures causing a breach in the SW return header piping downstream of SW-9 and the concurrent loss of Lake Dardanelle is highly unlikely and is not considered by ANO to be a credible event.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

Based on engineering judgement, the breach in the SW return header piping created by the MFW line HELB would not cause a decrease in SW system backpressure significant enough to render the SW system incapable of performing its design function. Therefore, considering Lake Dardanelle as an available source of water, the SW system would remain functional were the return header to rupture downstream of SW-9.

F. Basis For Reportability

Since the location of check valve SW-9 and its associated safety related piping in close proximity to a high energy MFW line created the possibility of a common mode failure of both loops of the SW system as a result of a HELB event, this condition is considered reportable pursuant to 10CFR50.73(a)(2)(ii)(B) as a condition outside the plants design basis.

This condition was also reported pursuant to 10CFR50.72 at approximately 2237 on October 26, 1990.

G. Additional Information

Another condition in which safety related equipment was located such that it could be damaged by a HELB was reported in LER 50-368/86-018-00.

Energy Industry Identification System (EIIS) codes are identified in the text as [XX].