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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. NPF-6
Licensee Event Report No. 50-313/90-002-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(ii)(B), attached is the subject report concerning the High Pressure Injection pump casing drain isolation valves not being qualified for maximum system operating pressure as a result of an inadequate original system design.

Very truly yours,

E. C. Ewing
General Manager,
Technical Support
and Assessment

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L I C E N S E E E V E N T R E P O R T (L E R)

FACILITY NAME (1) Arkansas Nuclear One, Unit One DOCKET NUMBER (2) | PAGE (3)
05101013 | 1 | 3 | 1 | 0 | 1 | 3

TITLE (4) High Pressure Injection Pump Casing Drain Valves Not Qualified for Maximum System Operating Pressure as a Result of an Inadequate Original System Design

EVENT DATE (5)			LER NUMBER (6)		REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
Month	Day	Year	Sequential Number	Revision Number	Month	Day	Year	Facility Names	Docket Number(s)
01	21	89	001	2	01	03	09		05101013

OPERATING MODE (9) N THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

POWER LEVEL (10)	20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vi)	50.73(a)(2)(vii)	50.73(a)(2)(viii)(A)	50.73(a)(2)(viii)(B)	50.73(a)(2)(x)	73.71(b)	73.71(c)	Other (Specify in Abstract below and in Text, NRC Form 366A)	
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L I C E N S E E C O N T A C T F O R T H I S L E R (1 2)

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C O M P L E T E O N E L I N E F O R E A C H C O M P O N E N T F A I L U R E D E S C R I B E D I N T H I S R E P O R T (1 3)

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

S U P P L E M E N T R E P O R T E X P E C T E D (1 4)

Yes (If yes, complete Expected Submission Date) No EXPECTED SUBMISSION DATE (15) Month Day Year

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

On February 28, 1990, it was determined by Design Engineering personnel that the manual isolation valves installed in High Pressure Injection (HPI) pumps P-36A and B casing drain lines were not designed for maximum HPI system operating pressure (3090 psig). It was determined that the potential stresses on these valves could exceed code allowable values and possibly exceed the yield strength of the valve material during operation of the HPI system in the 'piggyback' mode. The cause of this condition was determined to be inadequate design assumptions and drawing information. The HPI pump vendor drawings do not specifically indicate the location of the casing drain ports. As a result of this, the original design did not consider that the drain piping and valves would be connected to the pump discharge and that they would be subjected to high pressure conditions. Consequently, the casing drain piping and valves were designed as a low pressure system (ANSI 300 pound Class II) similar to that of the pump suction piping design. A design change was implemented which removed the HPI pump drain line piping and installed plugs in the pump casings. Additionally, AND current design change procedures provide for an in-depth review of the design basis for each system affected by new or changed designs.

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		Sequential	Revision		
		Year	Number	Number	
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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 1 (ANO-1) was operating at approximately 80 percent of rated power.

B. Event Description

On February 27, 1990, while developing a Design Change Package (DCP) to modify the casing drain system of the Makeup/High Pressure Injection pumps (P-36A, B,C), Design Engineering personnel determined that the pump casing drain lines and associated manual isolation valves for P-36A and B might not be qualified for the maximum operating pressure to which they could be subjected during High Pressure Injection (HPI) [BJ] system operation. The casing drain lines are located on the discharge side of the pumps and are exposed to full pump discharge pressure. However, they were originally designed as a 300 pound Class II piping system similar to that of the pump suction piping design. Engineering evaluations of this discrepancy concluded that, although not properly designed, the drain piping could withstand maximum postulated operating pressure (3090 psig). However, on February 28, after consultation with the valve manufacturer, it was determined that, considering worst case system operating conditions, the potential stresses on the manual drain valves could exceed code allowable values and possibly exceed the yield strength of the valve material.

Maximum system operating pressure is postulated to occur following the occurrence of a Loss of Coolant Accident (LOCA) with the HPI system operating in the 'piggyback' mode of operation (suction of HPI pumps aligned to the discharge of the Low Pressure Injection (LPI) [BP] pumps). This mode of operation would only be used in the unlikely event that the Borated Water Storage Tank (BWST) inventory were depleted prior to Reactor Coolant System (RCS) [AB] pressure dropping below the shutoff head pressure of the LPI pumps, thus allowing the recirculation of cooling water from the Reactor Building sump to the RCS.

C. Root Cause

The HPI pump vendor drawings do not specifically indicate the location of the drain ports. As a result of this, the original design did not consider that the drains would be connected to the pump discharge and that they would be subjected to high pressure conditions. Consequently, the casing drain piping and valves were designed as a low pressure system (ANSI 300 pound Class II) similar to that of the pump suction piping design. Therefore, the cause of this condition was determined to be inadequate design assumptions and drawing information.

D. Corrective Actions

A design change was implemented which removed the HPI pump drain line piping and associated manual isolation valves. Plugs have been installed in the pump casings.

ANO's current design development and design change procedures provide for an in-depth reconfirmation of the design basis for each system affected by new or changed designs. The fact that the deficiencies discussed in this report were identified during the review of an anticipated design change indicates that these procedures are effective in identifying existing design deficiencies and should prevent the occurrence of similar deficiencies.

E. Safety Significance

Operation of the HPI system in the 'piggyback' mode could have resulted in failure of the manual drain valves for P-36A and B and subsequent radioactive releases which were not assumed to occur in the plant's safety analysis. However, the significance of this condition is lessened considering the extremely low probability of the occurrence of a small break LOCA of the specific size to allow depletion of the BWST inventory without depressurization of the RCS which would necessitate operation of the HPI system in the piggyback mode.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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

F. Basis for Reportability

Operation of the HPI system in the 'piggyback' mode could have resulted in failure of the manual drain valves for P-36A and B and subsequent radioactive releases which were not assumed to occur in the plant's safety analysis. Therefore, this condition is considered to be reportable pursuant to 10CFR50.73(a)(2)(ii)(B) as a condition outside the design basis of the plant.

This condition was also reported in accordance with 10CFR50.72 at 1642 on February 28, 1990.

G. Additional Information

Previous similar events in which maximum expected system operating parameters were not considered in the original system design were reported in LERs 50-313/88-027-00 and 50-368/89-014-00.

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