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October 16, 2001

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Subject: Arkansas Nuclear One - Unit - 2
Docket No. 50-368
License No, NPF-6
Licensee Event Report 50-368/2001-001-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i)(B) and 10CFR50.73(a)(2)(vii), enclosed is the subject report concerning the Emergency Feedwater System. The enclosure contains no commitments.

Very truly yours,

Glenn R. Ashley
Manager, Licensing

GRA/tfs

enclosure

IE 22

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LICENSEE EVENT REPORT (LER)

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TITLE (4) Crediting A Designated Operator For Manual Action During Surveillance Tests Affected Operability Of The Emergency Feedwater System If Condensate Pumps Had Been Lost During The Tests

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	11	2001	2001	001	00	10	16	2001	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (Check one or more) (11)									
POWER LEVEL (10) 100	20.2201(b)	20.2203(a)(3)(i)	50.73(a)(2)(i)(C)	X	50.73(a)(2)(vii)					
	20.2201(d)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(A)		50.73(a)(2)(viii)(A)					
	20.2203(a)(1)	20.2203(a)(4)	50.73(a)(2)(ii)(B)		50.73(a)(2)(viii)(B)					
	20.2203(a)(2)(i)	50.36(c)(1)(i)(A)	50.73(a)(2)(iii)		50.73(a)(2)(ix)(A)					
	20.2203(a)(2)(ii)	50.36(c)(1)(ii)(A)	50.73(a)(2)(iv)(A)		50.73(a)(2)(x)					
	20.2203(a)(2)(iii)	50.36(c)(2)	50.73(a)(2)(v)(A)		73.71(a)(4)					
	20.2203(a)(2)(iv)	50.46(a)(3)(ii)	50.73(a)(2)(v)(B)		73.71(a)(5)					
	20.2203(a)(2)(v)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(C)		OTHER					
	20.2203(a)(2)(vi)	X 50.73(a)(2)(i)(B)	50.73(a)(2)(v)(D)		Specify in Abstract or NRC Form 366A					

LICENSEE CONTACT FOR THIS LER (12)

NAME T. F. Scott, Nuclear Safety and Licensing Specialist	TELEPHONE NUMBER (Include Area Code) 501-858-4623
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO X	EXPECTED SUBMISSION DATE (15)	MO	DAY	YEAR
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ABSTRACT (16)

Surveillance testing of the Emergency Feedwater (EFW) pumps has been conducted utilizing the Startup and Blowdown Demineralizer effluent as a suction source. The procedure required a designated Operator in communication with the Control Room with a duty to close a manual isolation valve if conditions developed during the test potentially affecting operability. Whether a Technical Specifications action statement should be entered while in this configuration was questioned. An Engineering evaluation determined that under worst-case conditions following a loss of all condensate pumps the operability of the EFW pumps could be affected. The action by the designated Operator may not have been timely to ensure EFW System operability under all conditions. The surveillance test method has been revised. The root cause of this condition was inadequate establishment and communication of management expectations regarding evaluations crediting manual actions that are used to maintain operability. Written guidelines are being developed. An assessment of this condition determined it to be non-risk significant.

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NARRATIVE (17)

A. Plant Status

At the time this condition was discovered, Arkansas Nuclear One Unit 2 (ANO-2) was operating in steady state conditions at 100 percent power.

B. Event Description

The potential was discovered for operability of both trains of the Emergency Feedwater (EFW) [BA] System to be affected during an event involving loss of all Condensate System [SD] pumps when EFW pump surveillance testing was in progress.

The EFW System consists of two independent trains that provide a safety-grade source of water to the Steam Generators (SGs) [AB] when needed to meet cooling requirements during accident conditions. One train uses a motor-driven pump and the other train uses a steam-driven pump. Either pump can supply water to either SG. The suction source for the pumps can be the Condensate Storage Tanks (CSTs) [KA], the discharge of the Startup and Blowdown (SU/BD) [WI] Demineralizer, or the Service Water (SW) [BI] System. At the time of initial plant operation prior to 1980, the suction source for EFW pumps was aligned to both a CST and the SU/BD Demineralizer effluent. The source at the higher pressure, normally the demineralizer effluent supplied from the Condensate System, would supply the EFW pumps. This alignment allowed surveillance testing of the pumps while preventing unnecessary use of CST inventory that has a Technical Specifications requirement and also minimized the introduction into the SG secondary system of water from the CST that was not the same quality as normal condensate.

In April of 1980, hotter than normal water entered the EFW pump suction line through valve 2CV-0706, the normally open, remotely operated isolation valve for the SU/BD Demineralizer effluent. The water was back-flow from the Feedwater System [SJ] through the Condensate System due to all Feedwater and Condensate pumps stopping during a Loss of Offsite Power (LOOP) event. Approximately twelve minutes after the LOOP, Operators noticed EFW flow oscillations and immediately closed 2CV-0706. The flow oscillations stopped. After SG inventory was at normal levels, the Operators conservatively stopped and vented each EFW pump, one at a time, to ensure that non-condensable gasses were not trapped in the pump casings. No gasses were detected during venting. The EFW function remained available during this event.

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As a result of this experience, the operating procedure for EFW was revised to require that 2CV-0706 be closed above five percent reactor power except during monthly pump surveillance testing. The Safety Analysis Report (SAR) (Updated Final Safety Analysis Report) original transmittal in 1982 contained a statement that the valve was closed above five percent power in order to preclude a challenge to the system if a loss of condensate occurred. A discussion of the temporary alignment during surveillance testing was not included in the SAR because it was considered below the required level of detail for SAR information. In 1984, 2CV-0706 was changed to a manual valve with tag number 2EFW-0706. This change was made because 2CV-0706 was vibrating causing bonnet bolting to break and raising concerns that the valve might inadvertently come open. In 1985, the operating procedure was revised to require 2EFW-0706 to be locked closed above ten percent power and this change was included in the next SAR amendment. In 1991, the operating procedure was revised to require that an Operator in communication with the Control Room be designated with a duty to close 2EFW-0706, if required, when it was open above ten percent power.

On May 11, 2001, an NRC Resident Inspector was observing routine surveillance testing of the EFW pumps. The Inspector questioned the acceptability of not entering a Technical Specifications action requirement when 2EFW-0706 was opened. The initial evaluation concluded that the existing practice was being conducted in accordance with the system operating procedure and SAR description and that system operability was being maintained by having a designated Operator who was available to take manual action to maintain operability by closing 2EFW-0706 if required; however, as a conservative measure, the valve was tagged closed pending results of a formal Engineering evaluation. Other corrective actions are described in Section "D."

C. Root Cause

The root cause of this condition was determined to be inadequate establishment and communication of management expectations. This involved two aspects.

In 1980, there was a lack of expectation that system operability needed to be addressed and documented while a system was in an off-normal alignment for surveillance testing. Until 1989, it was a common practice at ANO to align systems for testing purposes without entering a Technical Specifications (TS) action requirement. Because of this practice, aligning an EFW suction source that was susceptible to potentially affecting operability

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of both trains was not adequately reviewed. Because of changes implemented in 1989 to establish expectations and procedural guidance regarding entry into applicable TS actions during testing, no additional corrective actions to address this aspect of the root cause are required.

The second aspect involves the expectation regarding an appropriate level of rigor applied to evaluations that credit manual Operator actions for operability considerations. No specific written internal guidance has been provided related to crediting manual operator action to maintain equipment operability.

D. Corrective Actions

At the time that the condition was identified on May 11, 2001, valve 2EFW-0706 was tagged closed pending resolution of the concern.

An evaluation of the EFW System response to a loss of all Condensate pumps was completed by Design Engineering on May 25, 2001. This evaluation concluded that under worst-case conditions EFW pump minimum net positive suction head (NPSH) could occur in approximately five minutes following a loss of condensate.

Based on the results of the evaluation by Design Engineering, procedures were revised to align EFW pump suction to the CST for testing and prohibit opening 2EFW-0706 above ten percent power.

A review was completed of ANO-2 operational practices where Operator actions are relied upon to maintain operability of equipment important to safety. Three procedures were identified for further evaluation and are being addressed under the corrective action program. None of these issues represented a current operability concern. A similar review completed for ANO-1 revealed no issues.

Written guidance will be developed and provided to appropriate personnel to establish management expectations regarding the use of manual actions in maintaining equipment operability.

E. Safety Significance

The risk of performing EFW pump surveillance tests with 2EFW-0706 open was quantified using the ANO-2 Probabilistic Safety Assessment (PSA) model. The ANO-2 baseline Core Damage Frequency (CDF) is currently 7.764E-6/yr. It was determined that the change in CDF, without Human Recovery Actions (HRAs), from

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performing the surveillance tests is $1.730E-7$ /yr. This result falls within the Region III (non-risk significant) zone of Reg. Guide 1.174.

The instantaneous risk without HRA considerations, however, was calculated as $1.160E-4$ /yr. This value is considered unacceptable in the current Maintenance Rule 10CFR50.65(a)(4) risk program used at ANO. A human recovery analysis was performed that did not credit immediate closure of 2EFW-0706 but did take credit for actions to stop, vent, and restart the EFW pumps. Using this HRA value, a new instantaneous CDF value for the surveillance was calculated. The new value was $1.789E-5$ /yr, which is considered acceptable under the (a)(4) risk program.

The cumulative change in CDF with use of a "designated" Operator falls in Region III of Reg. Guide 1.174. Therefore, the overall potential safety significance of this condition was minimal.

F. Basis for Reportability

Following identification of this condition, an assessment of the designated Operator's ability to perform the required actions to assure continued operability of the EFW pumps was performed. This assessment concluded that Operator actions were likely to be effective even with a five-minute available response time. However, the time for a designated Operator to respond was more than would have resulted if a dedicated Operator had been stationed at the valve. On September 17, 2001, ANO determined that, in light of some uncertainty of the impact of this condition on EFW System operability, it would be appropriate to make this report on the basis, believed to be conservative, that Operator actions may not have been timely to ensure system operability during worst-case accident conditions.

The action requirement for EFW pumps contained in ANO-2 Technical Specification (TS) 3.7.1.2 does not address both pumps being inoperable. If having valve 2EFW-0706 open above ten percent power resulted in both EFW trains being inoperable, this would have placed the unit into the provisions of TS 3.0.3. A review of the Station Log reveals that there were occasions during the past three years when 2EFW-0706 was open for greater than one hour. NUREG-1022 Revision 2 Section 3.2.2, "Operation or Condition Prohibited by Technical Specifications," states that the condition "should be considered reportable under this criterion if the condition is not corrected within an hour..." Therefore, this condition is being reported in accordance with 10CFR50.73(a)(2)(i)(B).

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This condition is also being reported in accordance with 10CFR50.73(a)(2)(vii) as a common cause resulting in two independent trains becoming inoperable in a single system.

Based on the assessment demonstrating that the designated Operator's ability to close 2EFW-0706 within five minutes would likely be effective, empirical evidence from the 1980 LOOP event regarding the time that would actually be available to perform actions, and the effectiveness of human recovery actions if the valve had not been closed before reaching minimum NPSH, there is a reasonable expectation that fulfillment of the EFW System safety function would not have been prevented during system testing with 2EFW-0706 open. Therefore, this condition was not a loss of safety function.

G. Additional Information

The LOOP event in 1980 was documented in Licensee Event Report (LER) 50-368/80-018/03L-0 dated May 5, 1980, with supplements 80-018/03X-1 dated July 14, 1980, and 80-018/03X-2 dated August 9, 1985.

There have been no previous similar conditions reported by ANO as Licensee Event Reports.

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