

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Arkansas Nuclear One - Unit 2										DOCKET NUMBER (2)   PAGE (3)  05 0 0 0  3  6  8 10									
TITLE (4) MSIS Actuation and Reactor Trip																			
EVENT DATE (5)					LER NUMBER (6)					REPORT DATE (7)					OTHER FACILITIES INVOLVED (8)				
Month	Day	Year	Year		Sequential	Revision				Month	Day	Year			Facility Names	Docket Number(s)			
01	13	08	4	6	4	--	0	0	3	--	0	3	01	05	8	4	05 0 0 0		
OPERATING   THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5:																			
MODE (9)   2   (Check one or more of the following) (11)																			
POWER		20.402(b)			20.405(c)			<input checked="" type="checkbox"/> 50.73(a)(2)(iv)			73.71(b)								
LEVEL		20.405(a)(1)(i)			50.36(c)(1)			<input type="checkbox"/> 50.73(a)(2)(v)			73.71(c)								
(10)  0 0 4		20.405(a)(1)(ii)			50.36(c)(2)			<input type="checkbox"/> 50.73(a)(2)(vii)			Other (Specify in								
		20.405(a)(1)(iii)			<input checked="" type="checkbox"/> 50.73(a)(2)(i)			<input type="checkbox"/> 50.73(a)(2)(viii)(A)			Abstract below and								
		20.405(a)(1)(iv)			50.73(a)(2)(ii)			<input type="checkbox"/> 50.73(a)(2)(viii)(B)			in Text, NRC Form								
		20.405(a)(1)(v)			50.73(a)(2)(iii)			<input type="checkbox"/> 50.73(a)(2)(x)			366A)								
LICENSEE CONTACT FOR THIS LER (12)																			
Name															Telephone Number				
Patrick Rogers, Special Projects Coordinator															Area				
															Code				
															5 0 1 1 9 6 4 1 3 1 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								
X	C	B	F	C	V	F	I	3	0										
SUPPLEMENT REPORT EXPECTED (14)												EXPECTED		Month	Day	Year			
Yes (If yes, complete Expected Submission Date)   <input checked="" type="checkbox"/> No												SUBMISSION							
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)												DATE (15)							

On 1/30/84 at 0928 Unit 2 tripped on low steam generator pressure with a concurrent Main Steam Isolation System (MSIS) actuation from an initial power level of ~ 4% FP.

Prior to the transient, both emergency feed pumps were operating and the turbine was rolling at 1800 rpm for shaft polishing. In order to conserve condensate the steam driven emergency feed pump was taken off line and steam generator blowdown reduced. Steam generator levels could not be maintained and the RCS temperature decreased. The steam driven EFW pump was restarted for additional feed but only added to the cooldown. Feed was reduced and group 6 rods were fully withdrawn. A dilution was begun to further increase power and RCS temperature. However, a leaking boric acid flow control valve allowed boric acid to enter the chemical addition header and when the dilution was begun, concentrated boric acid was injected into the RCS by the dilution flow.

The unanticipated boric acid injection along with a positive moderator temperature coefficient, power reduction, and steam demand to the emergency feed pump and main turbine resulted in the cooldown of the RCS with the accompanying cooldown and pressure reduction of the secondary. MSIS actuated concurrently with the low pressure trip as designed.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Arkansas Nuclear One, Unit 2	1051010101	Year	Sequential Number	Revision Number	0210F012
TEXT (If more space is required, use additional NRC Form 366A's) (17)					

On 1/30/84 at 0928 Unit 2 tripped on low steam generator pressure with a concurrent MSIS actuation from an initial power level of ~ 4% FP. The generator was not on line. Prior to the transient, both emergency feed pumps were operating to maintain steam generator levels and the main turbine was rolling at 1800 RPM for exciter shaft polishing. At this beginning of life condition, the core had a positive moderator temperature coefficient of approximately  $.45 \times 10^{-4} \Delta K/K/^{\circ}F$ . In order to reduce the amount of condensate being used due to the turbine driven EFW pump (2P7A) exhaust to atmosphere it was decided to reduce power to approximately 2-3% and take 2P7A out of service and place it in standby. At 0900, steam generator blowdown was reduced and 2P7A taken off line.

As power was reduced and temperature decreased it was not possible to maintain steam generator levels, and 2P7A was restarted to maintain levels. This caused temperature to decrease more thus reducing secondary pressure. The operators reduced the emergency feed water flow rate to the steam generators and commenced pulling rods. Rods were pulled from 138 to 146 inches in group 6.

The operator then commenced diluting RCS to adjust power to maintain temperature. The operators felt that by CEA withdrawal and dilution alone, they could avert the reactor trip and maintain pressure and temperature, and would not have to trip the turbine. These actions were not sufficient to prevent low steam generator pressures. This was due in part to a leaking boric acid flow control valve, 2CV-4926 which allowed concentrated boric acid to enter the chemical addition header. When the dilution was begun, concentrated boric acid was injected into the RCS by the dilution flow.

The unanticipated boric acid injection along with a positive moderator temperature coefficient, power reduction, and steam demand to the emergency feed pump and main turbine resulted in the cooldown of the RCS with the accompanying cooldown and pressure reduction of the secondary system.

At 0928, MSIS actuated concurrently with a reactor trip on low steam generator pressure as designed. An unusual event was declared at 0930 because of the MSIS actuation. The MSIS actuation signal cleared at 0945 and the unusual event was terminated.

During the reactor trip recovery it was discovered that boric acid addition flow control valve 2CV-4926 was leaking. This valve is in the Chemical and Volume Control System. A manual valve downstream of 2CV-4926 was closed to terminate the boric acid flow. 2CV-4926 is a 1 inch Type 667-ES diaphragm actuated control valve manufactured by Fisher. The actuator is a size 30. 2CV-4926 was repaired by re-adjusting the stroke. Post-maintenance testing proved satisfactory operation of the valve. With the exception of 2CV-4926, all systems and components functioned as designed. Operators on shift were conferred with concerning the fact that they did not trip the unit prior to reaching the trip setpoint. A memorandum was issued to ANO-2 operators describing this event and emphasizing individual operator responsibilities and communications during transients.



ARKANSAS POWER & LIGHT COMPANY

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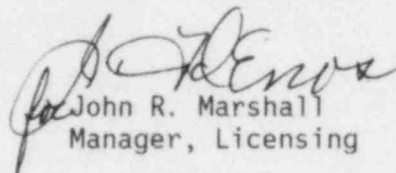
U. S. Nuclear Regulatory Commission  
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Subject: Arkansas Nuclear One - Unit 2  
Docket No. 50-368  
License No. NPF-6  
Licensee Event Report  
No. 84-003-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(iv), attached is the subject report concerning an actuation of the main steam isolation system during low power operation.

Very truly yours,

  
John R. Marshall  
Manager, Licensing

JRM:RJS:sl

Attachment

cc: Mr. John F. Streeter, Chief  
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