

FACILITY NAME (1)										DOCKET NUMBER (2) PAGE (3)													
Arkansas Nuclear One, Unit Two										10151010101 31 61 8110F1012													
TITLE (4)																							
Temporary Loss of Shutdown Cooling System Pump Suction Due to Erroneous RCS Level Indication																							
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)			
01	8	21	9	6	4	8	4	--	0	2	3	--	0	1	0	0	1	C	4	0151010101			
OPERATING MODE (9) 5 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5:																							
(Check one or more of the following) (11)																							
POWER		20.402(b)				J		20.405(c)				I		50.73(a)(2)(iv)				I		73.71(b)			
LEVFL		20.405(a)(1)(f)				I		50.36(c)(1)				I		50.73(a)(2)(v)				I		73.71(c)			
(10) 010101		20.405(a)(1)(ii)				I		50.36(c)(2)				I		50.73(a)(2)(vii)				I		Other (Specify in			
		20.405(a)(1)(iii)				X		50.73(a)(2)(i)				I		50.73(a)(2)(viii)(A)						Abstract below and			
		20.405(a)(1)(iv)				I		50.73(a)(2)(ii)				I		50.73(a)(2)(viii)(B)						in Text, NRC Form			
		20.405(a)(1)(v)				I		50.73(a)(2)(iii)				I		50.73(a)(2)(x)						366A)			
LICENSEE CONTACT FOR THIS LER (12)																							
Name										Telephone Number													
Donald B. Lomax, Plant Licensing Supervisor										Area													
										Code													
										151011916141-1311010													
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)													
I Yes (If yes, complete Expected Submission Date) X No										Month Day Year													
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																							

On 8/29/84, the plant was in Mode 5 and the reactor coolant system (RCS) level was being monitored by a temporary level indicator connected to the bottom of the RCS hot leg and vented to atmosphere. A nitrogen purge of the RCS was in progress to "sweep" hydrogen from the system prior to maintenance. The RCS was being vented via the RCS vessel head vent and due to nitrogen flow exceeding vent flow capacity the RCS became slightly pressurized. This resulted in a manometer effect and inaccurate indication of RCS level. The level indication inaccuracy led to draining of the water in the RCS hot leg below the minimum level for adequate shutdown cooling (SDC) pump suction. SDC loop flow indication began oscillating between 2000 gpm and 4000 gpm indicating cavitation of the SDC pump. Consequently the "B" SDC pump and nitrogen purge were secured. Decay heat removal alignment was shifted to the "A" SDC loop and normal flow of ~ 3000 gpm was established. During the period SDC flow was off, RCS bulk average temperature increased from ~ 140°F to ~ 205°F resulting in a change from Mode 5 to Mode 4. To prevent recurrence the temporary level system reference leg has been changed from venting to atmosphere to venting to the pressurizer steam space. Changes have been made to normal and abnormal operating procedures to improve system and operator response to similar events.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		Year	Number	Number	
Arkansas Nuclear One, Unit Two	0500031618	84	4	0	2
TEXT (If more space is required, use additional NRC Form 366A's) (17)					

On 8/29/84, following a reactor trip from 100% full power (FP) that had occurred approximately 36 hours prior to this event, (reference LER 50-368/84-024) the plant was in Mode 5 and the reactor coolant system (RCS) was being drained in preparation for a reactor coolant pump seal replacement. During this operation, a temporary loss of decay heat removal capability via the shutdown cooling (SDC) system occurred due to cavitation and vapor binding of the "B" SDC pump. Inadequate water volume in the RCS hot leg piping which led to the "B" SDC pump cavitation and vapor binding was caused by operator actions in response to incorrect RCS level indication.

The RCS was being maintained at approximately 140°F by the "B" SDC pump and heat exchanger. The "A" SDC pump was aligned in normal emergency core cooling system standby with pump suction aligned to the refueling water tank (RWT). The RCS level was being maintained at approximately 2 inches above the RCS hot leg (42 inch inside diameter), centerline by draining to the boron management system and monitoring a temporary local level indicator. The local level indicator consisted of a tygon tube standpipe connected to the bottom of the RCS hot leg and vented to atmosphere. A nitrogen purge of the RCS was in progress to "sweep" hydrogen from the system prior to maintenance. The RCS was being vented via the upper vessel head vent. So that vent sampling could be performed, a gas sample canister had been placed on the vent line. The vent path flow rate was exceeded by the nitrogen addition rate which slightly pressurized the RCS. This pressurization resulted in a manometer effect (with the tygon tubing being open to atmosphere) and inaccurate indication of RCS level in the temporary local level indicator. As a result of the inaccurate RCS level indications, the water level in the RCS hot leg was decreased by draining such that inadequate SDC pump suction resulted. Operations personnel are accustomed to seeing minor RCS level increases during this evolution due to delayed draining of the steam generator U-tubes.

During the RCS draining, the "B" SDC pump flow indication, monitored in the control room, began oscillating between 2000 gpm and 4000 gpm and the indicated RCS level began oscillating between 2 and 5 inches above the hot leg centerline. At 2055 hours, the "B" SDC pump and nitrogen purge were secured by operations personnel in an attempt to determine the true RCS level. During the following 10 minutes indicated RCS level increased to approximately 14 inches above the hot leg centerline as the RCS was refilled by gravity flow from the RWT through the "A" SDC pump into the RCS and as the RCS fluid expanded due to heatup. The "B" SDC pump was restarted to reestablish flow, however, flow oscillation was again observed and pump discharge pressure and flow ultimately decreased to zero approximately 10 minutes later indicating vapor binding and loss of suction. Operations personnel secured the "B" SDC pump at this time and decay heat removal alignment was shifted to the "A" SDC pump and heat exchanger. The "A" SDC pump was started at approximately 2145 hours and normal flow of approximately 3000 gpm was established.

SDC flow was lost or degraded for approximately 1 hour. During this time period the RCS bulk average temperature increased from approximately 140°F to approximately 205°F resulting in an inadvertent plant operational mode change from Mode 5 to Mode 4. This inadvertent mode change caused entry into Technical Specification 3.0.3. The highest indicated core exit thermocouple temperature reached approximately 259°F and based on observed system pressure, it is not believed that the RCS was in saturation during this event. The core remained fully covered during the temporary loss of SDC. Subsequent testing of the "A" SDC pump revealed no damage or degradation occurred during this event. To prevent recurrence of erroneous RCS level indication the temporary level system reference leg has been changed from venting to atmosphere to venting to the pressurizer steam space. In addition, the normal and abnormal operating procedures have been modified to enhance operator recognition of such events and to improve response time for restoration of SDC flow.



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October 2, 1984

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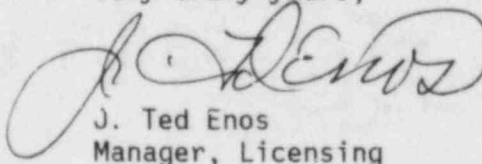
U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Licensee Event Report
No. 84-023-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i), attached is the subject report concerning a Reactor Coolant System (RCS) level indication inaccuracy which led to draining of water in the RCS hot leg below the minimum level for adequate shutdown cooling pump suction.

Very truly yours,



J. Ted Enos
Manager, Licensing

JTE:RJS:ac

Attachment

cc: Mr. Norman M. Haller, Director
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U. S. Nuclear Regulatory Commission
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Mr. Richard C. DeYoung
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