

NRC Form 366
(9-83)

U.S. Nuclear Regulatory Commission
Approved OMB No. 3150-0104
Expires: 8/31/85

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 Two

DOCKET NUMBER (2) | PAGE (3)
10510101 | 31 | 61 | 81 | 101 | 014

TITLE (4) Refueling Water Tank Level Transmitters Inoperable Due To Inadequate Freeze Protection Results In Operation Prohibited By Technical Specifications

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	08	01	01	01	21	08		01510101

OPERATING MODE (9) 1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)

POWER LEVEL (10)	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in Text, NRC Form 366A)
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(c)(2)(viii)(B)	
	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)
Name: Larry A. Taylor, Nuclear Safety and Licensing Specialist
Telephone Number: 5101191614-1311010

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
B	J	E	L	T					
			R	3					N

SUPPLEMENT REPORT EXPECTED (14)

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

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

On January 20, 1985 at 0415 hours, control room operators discovered that the indications for two of the four refueling water tank (RWT) water level transmitters that provide low water level signals for the recirculation actuation signal (RAS) had failed high. Freezing of the water in some portion of the level instrumentation system was suspected due to the ambient weather conditions. At 0525 hours, the indication for a third RWT water level transmitter also failed high. This required entry into Technical Specification (TS) 3.0.3 due to the loss of three RAS channels. At 0618 hours, one of the three frozen RWT water level transmitters was thawed and restored to operable status allowing exit from TS 3.0.3. The cause of this event was inadequate freeze protection of the RWT water level instrumentation. Due to the identified damaged insulation, the lack of adequate freeze protection for the instrument housing, and the frequent opening of the level instrument enclosures to check enclosure temperature, the ambient cold weather conditions resulted in freezing the water in 3 RWT water level instruments. A plant modification was completed in 1985 to improve the freeze protection for the RWT water level instrumentation. Additionally, periodic tests are now performed annually to ensure that the RWT water level instrumentation insulation is intact and the heating equipment is operable.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		Year	Sequential Number	Revision Number	
Arkansas Nuclear One, Unit Two	05000368	85	002	01	1021014

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

I. Description of Event

A. At the time of this event on January 20, 1985, Arkansas Nuclear One, Unit 2 (ANO-2) was in Operational Mode 1 (Power Operation) at approximately 100 percent of rated power. The Reactor Coolant System (RCS) [AB] pressure was approximately 2250 psia and RCS average temperature was approximately 580 degrees.

B. Component Identification

The components involved in this event are the four water level instruments [LT] on the refueling water tank (RWT) [BP] that provide low water level signals for initiation of the recirculation actuation signal (RAS) in the Engineered Safety Feature Actuation System (ESFAS) [JE]. The RWT is located outside of the containment auxiliary building. The sensing line for each water level instrument is heat traced and insulated, and the level transmitters are located in separate enclosures (housings) adjacent to the RWT.

C. Sequence of Events

On January 20, 1985 at 0415 hours, control room operators discovered that the indications for RWT water level transmitters 2LT-5639-3 and 2LT-5640-4 had failed high. Freezing of the water in some portion of the level instrumentation system was suspected due to the ambient weather conditions at the time (2 degree Fahrenheit and 20 mile per hour wind). RWT water level transmitters 2LT-5639-3 and 2LT-5640-4 and the corresponding RAS channels 3 and 4 were declared inoperable and the Action requirement for Technical Specification (TS) 3.3.2.1 was entered. RAS channel 3 was placed in the tripped condition, and RAS channel 4 was placed in bypass. The remaining two RAS channel instrument transmitters (2LT-5636-1 and 2LT-5637-2) were verified operable. Appropriate actions were initiated to thaw the frozen instrumentation.

At 0525 hours, the indication for the RAS channel 1 RWT water level transmitter (2LT-5636-1) also failed high. This resulted in 3 of the 4 RAS channels being inoperable and required entry into TS 3.0.3. At 0618 hours, the channel 3 RWT water level transmitter was thawed and restored to operable status allowing exit from TS 3.0.3. The channel 1 RWT water level transmitter was restored to operable status at 1530 hours allowing exit from the action statement for TS 3.3.2.1. The channel 4 RWT water level transmitter was restored to operable status at 1545 hours.

II. Event Cause

A. Event Analysis

Upon indication of the failed RWT water level instruments, work was initiated to restore the level instruments to operable status and determine the cause of the instrument failures. It was determined that the water in the RWT level instrument system had frozen. Additional heating was applied to the level instruments and sensing lines to thaw the instruments.

ANO-2 has experienced several previous events involving freezing of the RWT water level instruments (see LERs 50-368/79-001, 79-002, 79-008, 79-101, 80-091, and 81-009). As a result of these previous problems, the temperature inside each of the level instrument enclosures was being checked twice during each eight hour shift to ensure the operability of the installed heat tracing. Checking of the heat tracing required that the door for each instrument enclosure be opened to read an installed thermometer inside the enclosure. Opening of the cabinet door approximately once every four hours exposed the level instruments to the extremely cold ambient temperature. Additionally, damage/degradation of the sensing line insulation external to the instrument enclosures was observed. These conditions allowed the RWT water level instrumentation systems to freeze.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		Sequential		Revision												
		Year	Number	Number	Number											
Arkansas Nuclear One, Unit Two	01510101031618	8	5	--	0	0	2	--	0	1	0	3	0	F	0	4

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

B. Safety Significance

The RWT contains a sufficient amount of borated water for emergency core cooling system and containment spray system operation. The volume of water required by the safety injection and containment spray systems under worst case accident conditions is approximately 400,000 gallons. This provides sufficient water so that the ESF pumps can be supplied suction from the RWT for a minimum of 30 minutes after initiation of emergency core cooling and also provides adequate water for long term recirculation. For long term cooling, a continuous source of borated water is provided by recirculating water from the containment sump. The suction for emergency core cooling and containment spray pumps are automatically transferred to the containment sump upon receiving a RAS which is generated when 2 of the 4 RWT water level transmitters indicate a low RWT water level.

Control room operators were aware of the RWT water level instrument malfunctions during this event. In the event of an actuation of the emergency core cooling system, control room operators are required to verify proper ESFAS and RAS operation and response. Also, two additional RWT level transmitters that do not provide signals to the RAS were available to provide control room alarms on low RWT water level. Additionally, manual actuation of the RAS is available and can be initiated from the control room if necessary. Operator actions would have mitigated any failure of the system to actuate automatically during the time period the instrumentation was inoperable. However, due to the failure of 3 of the 4 RAS channels caused by a common condition, this event is considered to be safety significant.

C. Root Cause

The cause of this event was inadequate freeze protection of the RWT water level instrumentation. Due to the identified damaged insulation, the lack of adequate freeze protection for the instrument housings, and the frequent opening of the level instrument enclosures to check enclosure temperature, the ambient cold weather conditions resulted in freezing the water in 3 RWT water level instruments.

D. Basis for Reportability

TS 3.3.2.1. requires that a minimum of 3 out of the 4 RAS channels be operable in Operational Modes 1, 2, and 3. With only 2 of the RAS channels operable, the Technical Specification Action statement was entered which allowed 48 hours to restore a channel to operation. Following the failure of the third channel, only one RAS channel remained operable and TS 3.0.3 was entered. This constituted operation prohibited by Technical Specifications and is reportable under 10CFR50.73(a)(2)(i)(B). Additionally, this event is reportable under 10CFR50.73(a)(2)(vii) because a single condition (below freezing weather) caused at least two independent channels (RAS channels 1, 3, and 4) to become inoperable in a system designed to remove residual heat.

III. Corrective Actions

A. Immediate

Immediate actions consisted of expediting maintenance efforts to restore the RWT level instruments to an operable status. These efforts consisted of thawing the transmitters and sensing lines, construction of temporary enclosures around the existing transmitter housings, and providing additional heat sources to supplement the installed freeze protection equipment. The level instrumentation suffered no physical damage from the freezing and no components were required to be replaced. The calibration was checked prior to declaring the instruments operable.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Arkansas Nuclear One, Unit Two	DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
	05101013168	85--	Sequential	Revision	10410F104	
			Number	Number		
TEXT (If more space is required, use additional NRC Form 366A's) (17)		0	0	2--	0	

B. Subsequent

As a result of this event and previous similar events for which corrective action had been inadequate, a thorough evaluation was performed to determine what actions were necessary to prevent this problem from recurring. A plant modification was completed in 1985 to improve the freeze protection for the RWT water level instrumentation. This modification included the placement of additional insulation and heating equipment for the instrumentation enclosures and the replacement of the existing heat tracing and insulation for the sensing lines. Also as part of this modification, indication of enclosure temperature was added on the outside of the enclosure to allow observation of adequate heating without opening the enclosure door.

Additionally, periodic tests are now performed annually to ensure that the RWT water level instrumentation insulation is intact and the heating equipment is operable prior to freezing weather. No additional events involving the freezing of the RWT water level instrumentation have occurred since this event.

C. Future

None.

IV. Additional Information

A. Similar Events

Previous similar events have been documented by LERs 50-368/79-001, 79-002, 79-008, 79-101, 80-091, and 81-009.

B. Supplemental Information

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



ARKANSAS POWER & LIGHT COMPANY

September 28, 1988

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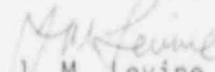
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

SUBJECT: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Licensee Event Report No. 50-368/85-002-01

Gentlemen:

Attached is the subject supplemental report concerning refueling water tank level transmitters inoperability due to inadequate freeze protection resulting in operation prohibited by Technical Specifications.

Very truly yours,


J. M. Levine
Executive Director
Nuclear Operations

JML:DAH:den

cc: Regional Administrator
Region IV
U. S. Nuclear Regulatory Commission
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

INPO Records Center
Suite 1500
1100 Circle, 75 Parkway
Atlanta, GA 30039

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