



# Entergy Operations

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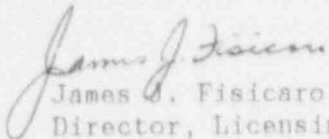
U. S. Nuclear Regulatory Commission  
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SUBJECT: Arkansas Nuclear One - Unit 1  
Docket No. 50-313  
License No. DPR-51  
Licensee Event Report 50-313/91-003-00

Gentlemen:

The enclosed Licensee Event Report is being submitted in accordance with  
10CFR50.73(a)(2)(iv).

Very truly yours,

  
James J. Fisicaro  
Director, Licensing

JJF/RHS/mmg  
Enclosure

cc: Regional Administrator  
Region IV  
U. S. Nuclear Regulatory Commission  
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Arkansas Nuclear One, Unit One  
Automatic  
DOCKET NUMBER (2) 050003131 OF 05  
PAGE (3) 5  
TITLE (4) Actuation of the Emergency Feedwater System During Plant Heatup due to Low Once through Steam Generator Level Which Resulted From a Leaking Feedwater Recirculation Valve.

EVENT DATE (5) 04/21/91  
LER NUMBER (6) 003--00  
REPORT DATE (7) 05/21/91  
OTHER FACILITIES INVOLVED (8)  
Facility Names  
Docket Number(s) 050003131 OF 05

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) 000  
20.402(b) 20.405(c) X 50.73(a)(2)(iv) 73.71(b)  
20.405(a)(1)(i) 50.36(c)(1) 50.73(a)(2)(v) 73.71(c)  
20.405(a)(1)(ii) 50.36(c)(2) 50.73(a)(2)(vi) Other (Specify in  
20.405(a)(1)(iii) 50.73(a)(2)(i) 50.73(a)(2)(vii)(A) Abstract below and  
20.405(a)(1)(iv) 50.73(a)(2)(ii) 50.73(a)(2)(viii)(B) in Text, NRC Form  
20.405(a)(1)(v) 50.73(a)(2)(iii) 50.73(a)(2)(x) 366A)

LICENSEE CONTACT FOR THIS LER (12)  
Name Richard H. Scheide, Nuclear Safety and Licensing Specialist  
Telephone Number 501964-5000  
Area Code

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)  
Cause System Component Manufacturer Reportable to NRC  
X B A I S V V 0 8 5 Y  
Cause System Component Manufacturer Reportable to NRC

SUPPLEMENT REPORT EXPECTED (14)  
EXPECTED SUBMISSION DATE (15)  
[ ] Yes (If yes, complete Expected Submission Date) [X] No

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

On April 21, 1991, with the reactor subcritical, the Emergency Feedwater System (EFW) was automatically actuated due to a low level in the "A" Once Through Steam Generator (OTSG). At the time of the event, OTSG levels were being lowered to 30 inches in accordance with the "Plant Startup" procedure. However, when the "A" OTSG reached its programmed level, the auxiliary feedwater pump (P-75) was unable to maintain the required level. OTSG level continued to decrease until the EFW system automatically actuated (13 inches). The EFW system operated as designed and quickly returned the OTSGs to their programmed level. The cause of this event was leakage through a closed valve (FW-8A) in the "A" OTSG feedwater recirculation line which resulted in a partial void in the feedwater line to the "A" OTSG. This void caused P-75 to reach a "runout" condition which rendered it incapable of feeding the OTSGs. FW-8A will be repaired prior to heatup from the next refueling outage. In addition, the "Plant Startup" procedure will be revised by July 31, 1991 to include steps requiring backup isolation for FW-8A and B and verifying that P-75 is capable of feeding the OTSGs prior to reaching 30 inches during heatup.

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
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Arkansas Nuclear One, Unit One	05000313	91	003	00	02 OF 05

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

A. Plant Status

At the time of this event, Arkansas Nuclear One, Unit One (ANO-1) was preparing for startup following a maintenance outage. The reactor was subcritical with the Group 1 control rods withdrawn to their upper limits to establish immediate negative reactivity addition capability. Reactor Coolant System (RCS) [AB] pressure was approximately 2250 psig for an elevated system pressure walkdown and temperature was 538 degrees. Once Through Steam Generator (OTSG) pressure was approximately 900 psig.

B. Event Description

On April 21, 1991, at approximately 2150, the Emergency Feedwater System (EFW) [BA] was automatically actuated by the Emergency Feedwater Initiation and Control system (EFIC) in response to a low level in the 'A' OTSG.

The EFIC system monitors OTSG levels and pressures, Main Feedwater pump status, reactor coolant pump (RCP) status and Engineered Safeguards Actuation System [JE] channels 3 and 4 in order to initiate EFW or OTSG isolation should an actuation setpoint be reached. The EFW system, which includes a motor driven as well as a steam driven feedwater pump, is actuated to protect the reactor core from an overheating condition upon loss of main feedwater or RCP circulation. OTSG isolation is actuated to protect the core from an overcooling condition if a main steam line rupture should occur.

At the time of the event, OTSG levels were being lowered from 185 inches to 30 inches in accordance with the "Plant Startup" procedure (OP1102.02). The auxiliary feedwater pump (P-75) was in service, being supplied by one condensate pump, and the startup valves (CV-2623 and CV-2673) were closed and in automatic control to allow them to open and control OTSG levels when the low level limits (30 inches) were reached. The 'B' OTSG reached its low level limit first and CV-2673 began controlling level at approximately 29 inches. At 2144, when the 'A' OTSG reached its low level limit, the licensed control board operator observed that the level continued to decrease below 30 inches. It was also observed that the 'B' OTSG level had begun to decrease. Operators then determined that P-75 discharge pressure was less than OTSG pressures. At this time, additional operations personnel were dispatched to search for possible leaks in the condensate/ feedwater system. OTSG levels continued to decrease until, at 2150, the EFW system was automatically actuated providing feedwater to the OTSGs. The introduction of cold feedwater to the OTSGs caused a decrease in pressure to approximately 850 psig. Upon observing the decreasing OTSG pressures, and in conjunction with the other abnormal secondary system indications, the control board operator manually tripped the Group 1 control rods in consideration of the possibility of a main steam line break. The EFW system quickly returned the OTSGs to their programmed levels. The steam driven EFW

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pump (P-7A) was secured at 2200, while the motor driven pump remained in service (P-7B) supplying the OTSGs. The auxiliary feedwater pump was secured and inspected to determine if it had incurred any damage. The inspection revealed no obvious damage to the pump. It was restarted at 2205. At 2210, after verifying that the auxiliary feedwater pump was operating normally, P-7B was secured and the EFIC system was reset. At 2237, the reactor trip was reset and plant startup was continued.

C. Root Cause

The cause of this event was determined to be leakage past the seat of FW-8A (feedwater recirculation line) which was closed at the time of this event, and through FW-9A, which was open, to the condenser (see attachment). This leakage, over a period of time when OTSG feedwater was not required, resulted in the feedwater line between CV-2623 and FW-7A becoming voided. When the 'A' OTSG reached its lower limit, CV-2623 began to open as designed. However, since flow was entering a partially voided line, the OTSG level continued to drop and CV-2623 continued to ramp open in response to the decreasing level. As CV-2623 continued to open, P-75 discharge pressure dropped below OTSG pressure, and the 'B' OTSG level began to decrease, resulting in the 'B' startup valve (CV-2673) beginning to open farther. It is believed that P-75 pumping into the voided feedwater line resulted in the pump reaching a 'runout' condition which rendered it incapable of supplying feedwater to the OTSGs.

D. Corrective Actions

FW-8A will be repaired prior to plant heatup from refueling outage 1R10, which is scheduled to begin in April, 1992. FW-9A is presently closed, effectively isolating the feedwater recirculation line. This line is not expected to be used prior to restart from 1R10.

Additional corrective actions which will be taken to aid in preventing the occurrence of similar events during future plant startups include:

- The 'Plant Startup' procedure (OP 1102.02) will be revised by July 31, 1991 to require that FW-9A and B be closed whenever FW-8A and B are required to be closed.
- The 'Plant Startup' procedure will also be revised to include a requirement to verify the ability to feed the OTSGs with the auxiliary feedwater pump prior to reaching the low level limits when lowering OTSG levels during startup. This revision will also be completed by July 31, 1991.
- A repetitive maintenance task has been developed for FW-8A, FW-8B, FW-9A and FW-9B.

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

E. Safety Significance

The EFW system was actuated and operated as designed during this event. In addition, the reactor was subcritical at the time and no significant RCS perturbations resulted from the event. Therefore, there was no safety significance associated with the event.

F. Basis For Reportability

The automatic actuation of the EFW system as well as the manual tripping of the Group 1 control rods is reportable pursuant to 10CFR50.73(a)(2)(iv).

This event was also reported in accordance with 10CFR50.72 at 2345 on April 21, 1991.

G. Additional Information

There have been no previous similar events reported by ANO.

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

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	0 5 0 0 0 3 1 3	9 1 --	0 0 3 --	0 0	0 5 OF 0 5

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

ATTACHMENT

