

NRC Form 366
(9-83)U.S. Nuclear Regulatory Commission
Approved OMB No. 3150-0104
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	Arkansas Nuclear One - Unit One	DOCKET NUMBER (2)	PAGE (3)
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TITLE (4) Inadequate Work Controls Resulted In A Non-Isolable Reactor Coolant System Leak Which
Necessitated A Plant Shutdown

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

POWER	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
LEVEL	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
(10) 0 0 0 0	20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify in
	20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(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	Telephone Number
Larry A. Taylor, Nuclear Safety and Licensing Specialist	Area Code 5 0 1 9 6 4 - 3 1 0 0

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

Cause	System	Component	Manufacturer	Reportable to NRPDS	Cause	System	Component	Manufacturer	Reportable to NRPDS

SUPPLEMENT REPORT EXPECTED (14)

EXPECTED	Month	Day	Year
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 December 16, 1988, at approximately 2330, during the performance of a post maintenance leak test on Makeup/High Pressure Injection (HPI) manual isolation valve MU-45C, a non-isolable Reactor Coolant System (RCS) leak of approximately 29 gpm developed which necessitated declaration of a Notification of Unusual Event (NUE) and a plant shutdown and cooldown. Prior to this event a seal weld repair of the body to bonnet area on MU-45C was being performed with the plant in the hot standby condition (2150 psia, 535 degrees). To perform the repair, the valve was closed and the valve packing retainer was loosened to relieve internal pressure prior to welding. After the repair, a leak test was attempted by opening the valve. The repair crew, however, had not tightened the packing retainer and RCS pressure displaced the packing gland assembly, resulting in the leak. Attempts to close the valve were unsuccessful. A NUE was declared at 2337 and a plant shutdown and cooldown were initiated. At 0415 on December 17, MU-45C was closed which stopped the leak and the NUE was terminated. Repair of the valve was completed with the plant in cold shutdown. The cause of this event was inadequate work controls (i.e., pre-job briefing, job turnover, job instructions, and component hold/caution card tagging) used to perform the activity under the existing plant conditions. Long term corrective actions addressing the needed work control improvements are underway. The significance of this event is minimized in that the leak was within the capability of the Makeup/HPI to maintain RCS inventory and did not affect the capability to place the plant in cold shutdown.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		Sequential	Year	Number	
Arkansas Nuclear One - Unit One	05000031388--	023--	0	0020F013	

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

A. Plant Status

At the time of this event on December 16, 1988, Arkansas Nuclear One, Unit 1 (ANO-1) was in the hot standby condition with Reactor Coolant System (RCS) temperature at approximately 535 degrees Fahrenheit and pressure at 2150 psia. The reactor was critical at a power level of approximately zero percent.

B. Event Description

On December 16, 1988, at approximately 2330, during the performance of a post maintenance leak test on Makeup/High Pressure Injection (HPI) manual isolation valve MU-45C, a non-isolable RCS leak of approximately 29 gpm developed which necessitated declaration of a Notification of Unusual Event (NUE) and a plant shutdown and cooldown.

MU-45C is one of four (MU-45A, B, C and D) normally open, manually operated valves which can be used to isolate the HPI system injection lines from the RCS cold legs. During the recent refueling outage (1R8), these valves had been disassembled to allow inspection of the thermal sleeves in the HPI injection line nozzles. Subsequent to their reassembly, a body to bonnet leak was discovered on MU-45A after refilling the RCS with water. Previous experience with this type of valve, which utilizes a pressure seal ring, had shown that they tend to seal and stop leaking when pressurized. However, during the plant heatup on December 8, 1988, MU-45A continued to leak and MU-45C was also observed to have a body to bonnet leak. A temporary repair of the leaking valves by a sealant injection was attempted but was not successful. The existing leakage from the valves was evaluated and a decision was then made to continue plant startup and to perform a seal weld repair on the valves when the unit was returned to the hot standby condition.

On the morning of December 16, 1988, an extensive pre-job briefing was conducted with all groups involved in the repair effort. Due to limited personnel availability, AP&L personnel were assigned to work MU-45A, while maintenance contract personnel were assigned to work MU-45C. The work process was discussed in detail, as well as the safety precautions to be taken since the work was to be performed with the plant at 535 degrees and 2150 psia. The only isolation capability available was accomplished by placing the valves in the closed position during the repair. During review of the job orders issued for the repair effort, which contained the repair instructions, it was noted that a step requiring loosening of the packing gland retainer nuts to relieve internal valve pressure prior to welding had been inadvertently omitted. An attachment to the job order was issued to include this additional instructional step.

At approximately 1600 on December 16, 1988, with the plant in hot standby, MU-45A and MU-45C were shut and locked to allow the repair work to begin. Closing the valve(s) isolated the portion of the valve(s) to be seal welded from RCS pressure and also allowed loosening of the valve(s) packing gland without experiencing RCS leakage from the gland area. Shift change took place at approximately 1830. There was, however, no turnover of work status conducted between the oncoming and offgoing crews. Additionally, none of the night shift crew (i.e., shift supervisor, QC inspector, or welder), nor any of the shift operations staff had attended the pre-job briefing conducted on December 16, 1988. At approximately 2330, the repair work was completed on MU-45C and an operator was dispatched to the job site to open the valve for leak testing. Neither the welder nor the QC inspector who were at the valve were cognizant that the packing gland retainer for the valve was "backed off" or that it needed to be tightened prior to opening the valve for leak testing. The operator, upon arriving at the valve, noticed that the packing gland retainer was loosened, but didn't realize that it was essentially completely disassembled (no thread engagement of gland retainer bolts). The operator then unlocked MU-45C and "cracked" the valve open to test the seal welded area for leaks. As soon as the valve left the closed position, water in the HPI injection piping began blowing by the packing gland assembly. The packing gland parts were displaced by RCS system pressure (2150 psia), resulting in a leak of approximately 29 gpm. The operator attempted unsuccessfully to close the valve. An additional operator was summoned to the scene, but attempts to reach the valve were now unsuccessful due to the leakage change from HPI injection piping water to hotter (535 degrees) RCS water in the form of steam. The Control Room had been immediately notified when the leak occurred, and within minutes, a reactor shutdown was initiated. A Notification of Unusual Event (NUE) was declared at 2337 and a plant cooldown to cold shutdown was initiated. At 0415 on December 17, 1988, MU-45C was closed, the leak was stopped and the NUE was terminated.

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Arkansas Nuclear One - Unit One	0 5 0 0 0 3 1 3 8 8 --	0 2 3 --	0 0 3 0 0 3
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C. Safety Significance

The significance of this event is minimized in that the 29 gpm leak was well within the Makeup/HPI systems capability to maintain RCS inventory and did not significantly affect the capability to place the plant in cold shutdown. In addition, the location of the leak (i.e., through the valve packing gland) was such that the leak rate was not likely to increase. There was no release of radioactive material to the environment as a result of this event.

D. Root Cause

The root cause of this event was determined to be an inadequate work controls. The job orders which were issued to accomplish the valve repair did not contain enough detail to ensure proper completion of the job without incident considering the plant conditions during performance of the activity, the potential impact of the work on plant and personnel safety and the type of personnel involved in the activity. Some critical steps needed to accomplish the work were not in the proper sequence and the instructions provided were incomplete. This created an undue burden on the different personnel performing the repair because it required them to remember and ensure that steps such as re-tightening the packing gland were performed prior to opening the valve for leak testing.

A contributing factor to this event was inadequate communication between supervisory personnel involved in the activity and the personnel performing the work. For example, there was no shift turnover conducted for the MU-45C valve crew nor was there a pre-job briefing for the night shift prior to commencing work. Additionally, no "hold" or "caution" cards were placed on the valve(s) as locking the valve(s) in the open position was believed to be an acceptable control.

E. Basis for Reportability

At 2337 on December 16, 1988, the NRC was notified of this event via the Emergency Notification System in accordance with 10CFR50.72(a)(1)(i) and 10CFR50.72(B)(1)(i)(A).

Technical Specification 3.1.6 requires the reactor to be shutdown if the total reactor coolant leakage exceeds 10 gpm. Since a non-isolable 29 gpm leak occurred which necessitated a plant shutdown in accordance with the plant's Technical Specifications, this event is reportable pursuant to 10CFR50.73(a)(2)(i)(A).

F. Corrective Actions

Following RCS cooldown and depressurization, the packing was replaced in MU-45C. A work plan with step by step instructions and required signoffs was written to complete the repair work on MU-45A & MU-45C. The work was completed and the valves were returned to service.

Longer term corrective actions to preclude recurrence of this type event will include the following:

- 1) a management reemphasize of the overall responsibilities of maintenance to properly complete work before release and of operations to assure work is satisfactory before a return to service,
- 2) a revision of procedures to improve control of maintenance activities by addressing: attendance at pre-job briefings, written logs for turnover of job activities, improved criteria for requirements of work plan development or increased detail in job instructions, and requirements for job orders to be at the work location, and
- 3) a revision of procedures to improved controls related to appropriate use of hold and caution cards which will define those limited exceptions for card(s) installation requirements.

G. Additional Information

There have been no previous similar reportable events.

Energy Industry Identification Codes (EIIS) are included in the text as [XX].



ARKANSAS POWER & LIGHT COMPANY

April 7, 1989

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U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Licensee Event Report No. 50-313/88-023-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i), attached is the subject report concerning inadequate work controls which resulted in a non-isolable reactor coolant system leak which necessitated a plant shutdown.

Very truly yours,

J. M. Levine
J. M. Levine
Executive Director,
Nuclear Operations

JML:RHS:vgh
attachment

cc w/att: Regional Administrator
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11