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March 30, 1990

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SUBJECT: Arkansas Nuclear One - Unit 1
Docket No. 50-313
License No. DPR-51
Licensee Event Report No. 50-313/90-001-00

Gentlemen:

In accordance with 10CFR50.73(a)(2)(i)(A), attached is the subject report concerning a plant shutdown as required by Technical Specifications due to a loss of Reactor Building integrity involving leakage through a Reactor Building cooling coil and associated reactor building isolation valve.

Very truly yours,

E. C. Ewing
General Manager
Technical Support
and Assessment

ECE/DBS/abw
Attachment

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(9-83)U.S. Nuclear Regulatory Commission
Approved OMB No. 3150-0204
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (3) Arkansas Nuclear One, Unit One

DOCKET NUMBER (2) PAGE (3)

10151010101 31 21 21210101010

TITLE (4) Plant Shutdown As Required By Technical Specifications Due To a Loss of Reactor Building Integrity Involving Leakage Through a Reactor Building Cooling Coil and Associated Reactor Building Isolation Valve

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
01	21	89	01	01	01	01	31	01	01
									Docket Number(s)
									0151010101
									0151010101
OPERATING MODE (9) THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5. (Check one or more of the following) (11)									
POWER	20.402(b)		20.405(c)		50.73(a)(2)(iv)		75.71(b)		
LEVEL	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		75.71(c)		
(20)	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
Daryl Saulsberry, Nuclear Safety and Licensing Specialist	Area
	Code
	510121816141-13121010

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
X	B	K	C	C	L				N

SUPPLEMENT REPORT EXPECTED (14)

EXPECTED SUBMISSION DATE (15)	Month	Day	Year

Yes (If yes, complete Expected Submission Date) (X) No

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

On February 28, 1990 at 2015 a plant shutdown was initiated as required by Technical Specification 3.6.2 due to a loss of Reactor Building (RB) integrity. Loss of RB integrity had occurred due to a combined effect of a service water cooling coil leak on 'D' RB cooler (VCC-2D) and leakage past the cooling coil isolation valve which also serves as a RB isolation valve. To prevent leakage through the cooling coil boundary, blind flanges were installed in the inlet and outlet piping for the leaking coil within VCC-2D. In addition, the isolation valve has been scheduled for repair or replacement during the next refueling outage. These conditions existing simultaneously constituted a degraded ability of the RB structure to perform its design function of limiting a radioactive release during an accident condition. This particular event has had minimal safety significance considering that no accident condition existed within the RB structure during this time. This event is reportable pursuant to 10CFR50.73(a)(2)(i)(A) as the completion of a plant shutdown required by Technical Specifications.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (5)
Arkansas Nuclear One, Unit One		Year	Sequence Number	Revision Number	
	0151010101 31 11 31	91 0 --	0 0 1 --	0 0	101210F1013

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

A. Plant Status

At the time this condition was discovered, Arkansas Nuclear One, Unit 1 (ANO-1) was in power operations at 80 percent. Reactor Coolant System (RCS) [AB] temperature was 579 degrees Fahrenheit and Reactor Coolant System pressure was approximately 2155 psig.

B. Event Description

On February 28, 1990, at 2015 a plant shutdown was initiated as required by Technical Specification 3.6.1 due to a loss of Reactor Building (RB) [NH] integrity. Loss of Reactor Building integrity had occurred due to a combined effect of a service water cooling coil leak on 'D' Reactor Building cooler (VCC-2D) and leakage past the seat of CV-3815 which serves with CV-3813 as isolation valves for VCC-2D and VCC-2C. The inlet isolation valve for VCC-2D (CV-3813) is a motor operated gate type valve; whereas, the outlet isolation valve for VCC-2D (CV-3815) is a pneumatically operated butterfly valve manufactured by Contramatic. RB cooling units such as VCC-2D consist of eight separate coils which are flanged together.

On February 20, 1990, while performing a monthly RB cooling unit test it was discovered that the outlet valve (CV-3814) on 'A' and 'B' RB cooling units (VCC-2A and VCC-2B) would not stroke open on the initial attempt. This condition was caused by elevated pressure against the valve seating surface resulting from a hydraulic lock being created between the normally closed Reactor Building cooler inlet and outlet valves. In this case, the hydraulic lock was the product of thermal volumetric expansion and occurred when service water between the inlet and outlet valves on the Reactor Building cooling coils at lake temperature was heated to Reactor Building ambient temperature. This resulted in CV-3814 being declared inoperable. To alleviate the pressure on CV-3814, the inlet valve (CV-3812) was opened which depressurized the line between CV-3814 and CV-3812 allowing CV-3814 to open within its normal time limit. Further investigation during this time revealed the pressure between CV-3812 and CV-3814, while the line was pressurized, was 259 psig. The redundant Reactor Building cooling coil units (VCC-2C and VCC-2D) were verified operable along with the associated inlet and outlet valves (CV-3813 and CV-3815).

After implementing a procedure revision which changed the normal position of the inlet isolation valves from closed to open, an observation was made by the Control Room Operator that the RB sump fill rate had increased. During this time the sump fill rate increased from 0.13 gpm to 0.25 gpm with a subsequent chemical analysis identifying the water in the sump as originating from the service water system. Individual RB cooler groups were systematically isolated during the investigation to determine which cooler group was leaking. This investigation indicated leakage was coming from either VCC-2C or VCC-2D.

Following a RB entry for the purpose of cooler inspection, it was determined that VCC-2D contained a coil leak. This condition along with concurrent leakage past either the inlet or outlet isolation valve constitute a loss of Reactor Building integrity which requires a plant shutdown (Technical Specification 3.6.1) and the declaration of an Emergency Class (Notification of an Unusual Event) based on current criteria. In this case, leakage past the inlet or outlet isolation valve was evidenced by continued coil leakage when the isolation valves were closed. A power reduction was initiated on February 28, 1990 at 2015 with hot shutdown conditions obtained on March 1, 1990 at 0100.

C. Root Cause

The cause for the loss of RB integrity was the service water leak on VCC-2D. An engineering evaluation was conducted and it was concluded that the tube leak in VCC-2D was the result of a localized corrosion pitting mechanism rather than overpressurization due to the volumetric expansion of confined service water within the cooling coil.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (5)
Arkansas Nuclear One		Year	Sequential Number	Revision Number	
	0151010101 31 31 31	91 0 --	0 0 1 --	0 0	013101013

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

D. Corrective Actions

In accordance with Technical Specification 3.6.1, a plant shutdown was initiated on February 28, 1990 at 2015 in response to a loss of Reactor Building integrity. A Reactor Building cooling coil leak in conjunction with a leaking cooling coil isolation valve, which also serves as a containment isolation valve, resulted in the loss of containment integrity and subsequent plant shutdown. Several corrective actions, in addition to the plant shutdown, have been or will be implemented to prevent this situation from recurring.

As an interim measure, to prevent additional leakage through the cooling coil boundary, blind flanges were installed in the inlet and outlet connections for the leaking coil within VCC-2D. This modification has not significantly affected the cooling capacity of the RB coolers, according to an evaluation conducted by Arkansas Power & Light, and has effectively isolated the leaking cooling coil until the cooling coil can be replaced. This work will be conducted during the next scheduled refueling outage. Additionally, the RCS leak detection procedure was revised to require a RB sump sample analysis, if the RB sump fill rate increases above the 5 day average by more than 0.1 gpm. If the RB sump sample results indicate the source of the increased fill rate is from service water, steps will be initiated to perform a RB entry to inspect accessible areas. These activities address corrective actions in regards to leakage through the boundary created by the cooling coil.

In addition to addressing leakage through the cooling coil, corrective actions also were implemented to monitor and minimize leakage through the cooling coil isolation valves. To accomplish this, CV-3815 has been scheduled for repair or replacement during the next refueling outage to limit leakage through this boundary. A monitoring program will be conducted to test CV-3814 and CV-3815 for leakage along with surveying and determining applicable practices from other utilities regarding leak testing, surveillance criteria, and Appendix J and Section XI program interpretations for this type of valve utilized in GDC-57 applications. GDC-57 valves will be reviewed to determine the need for upgraded or augmented testing and surveillance. If augmented testing and surveillance is determined to be necessary, requirements will be added to the appropriate AND testing program. These recommendations are short-term actions to be completed by the 3R9 outage (October, 1990).

E. Safety Significance

This incident has potential safety significance considering that a RCS leak in the Reactor Building may result in a radiological release to the outside environment if Reactor Building pressure exceeds service water pressure at the cooling coil. In addition to the coil leak and elevated pressure conditions required for an actual release, one of the cooler isolation valves would also have to leak to develop a condition which would result in an offsite release of radiological material. These conditions existing simultaneously constitute an inability of the containment structure to perform its design function of preventing a radioactive release during an accident condition. If a radioactive release was present during this time, in the service water system, it would have been detected by a service water process radiation monitor (RE-3815) or the discharge flume process monitor (RE-3618). This particular event, in actuality, has had minimum safety significance considering that no accident or elevated pressure condition existed within the containment structure during this time.

F. Basis for Reportability

This event is reportable pursuant to 10CFR50.73(a)(2)(i)(A) which involves the completion of a plant shutdown as required by Technical Specifications. An one hour notification was made at 2040 on February 28, 1990, pursuant to 10CFR50.72(a)(1)(i) and 10CFR50.72(b)(1)(i)(a) which involves the declaration of an emergency classification.

G. Additional Information

There have been no previous similar events at AND related to a Technical Specification required plant shutdown due to loss of containment integrity involving failed components.

Reference Correspondence submitted on March 2, 1990, addressing the evaluation of RB coolers service water isolation valve (ICANR39006 with accompanying engineering report 90R-1006-01).

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