



Nebraska Public Power District

COOPER NUCLEAR STATION
P.O. BOX 98, BROWNVILLE, NEBRASKA 68321
TELEPHONE (402) 825-3811

CNSS923720

August 13, 1992

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

Dear Sir:

Cooper Nuclear Station Licensee Event Report 92-012, Revision 0, is being forwarded as an attachment to this letter.

Sincerely,

R. L. Gardner
Plant Manager

RLG/bjs

Attachment

cc: R. D. Martin
G. R. Horn
J. M. Meacham
R. E. Wilbur
V. L. Wolstenholm
D. A. Whitman
INPO Records Center
NRC Resident Inspector
R. J. Singer
CNS Training
CNS Quality Assurance

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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Cooper Nuclear Station										DOCKET NUMBER (2) 0 5 0 0 0 2 1 9 8										PAGE (3) 1 OF 0 5						
TITLE (4) Inoperability Of RCIC-MOV-MO16 Due To Water Intrusion Into The Motor Operator Caused By A Packing Leak And A Defective Conduit Shield																										
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)									
0	7	1	5	4	2	9	2	0	1	2	0	0	0	8	1	3	9	2	0 5 0 0 0 0							
OPERATING MODE (9)				THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5 (Check one or more of the following) (1)																						
N				20.402(b)				20.406(a)				50.73(a)(2)(iv)				73.71(b)										
POWER LEVEL (10)				20.406(a)(1)(i)				50.36(a)(1)				X 50.73(a)(2)(v)				73.71(e)										
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				20.406(a)(1)(iii)				50.73(a)(2)(i)				50.73(a)(2)(vii)(A)				OTHER (Specify in Abstract below and in Test NRC Form 365A)										
				20.406(a)(1)(iv)				50.73(a)(2)(ii)				50.73(a)(2)(viii)(B)														
				20.406(a)(1)(v)				50.73(a)(2)(iii)				50.73(a)(2)(ix)														
LICENSEE CONTACT FOR THIS LER (12)																										
NA 12										TELEPHONE NUMBER																
Donald L. Reeves, Jr.										AREA CODE																
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)																										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC																	
X	B	N	2 0	L 2 0 0	Y																					
SUPPLEMENTAL REPORT EXPECTED (14)										EXPECTED SUBMISSION DATE (15)																
YES (If yes, complete EXPECTED SUBMISSION DATE)										MONTH DAY YEAR																
X NO																										

ABSTRACT (Limit to 1400 spaces, i.e. approximately fifteen single space typewritten lines) (18)

On July 15, 1992 at 1:44 a.m., while performing the Reactor Core Isolation Cooling (RCIC) surveillance test, RCIC-MOV-M016, the outboard steam supply isolation valve, was closed but failed to reopen. Instead, when the control switch was positioned to OPEN, the valve overload alarm was received. Upon recognizing that the valve was not operating, the breaker for the motor operated valve (MOV) was manually opened. Subsequently, with no indication of motor damage, a second attempt was made to open the valve and was successful. At 3:43 a.m., following further investigation of the valve operator, the RCIC System was declared inoperable. At the time, the plant was at approximately 100 percent power under normal operating conditions.

A hair-line crack was found in the flexible steel conduit installed to protect the wiring between the limit switch compartment and the nearby terminal box. Due to the proximity of the conduit to the packing leak from the valve, this breach allowed entry of moisture into the conduit. The resulting condensate accumulated in the MOV limit switch compartment and terminal box, causing the anomalous behavior of the valve. During the 1991 Refueling Outage, the valve packing gland had been adjusted. Repacking of the valve or addition of packing had not been considered necessary.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 2	0 1 2	0 0	0 2	OF 0 5

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

A. Event Description

On July 15, 1992 at 1:44 a.m., while performing surveillance testing in accordance with Surveillance Procedure (SP) 6.3.6.2, RCIC Valve Operability, RCIC-MOV-M016, the outboard steam line isolation valve located in the steam tunnel, was closed but failed to reopen. Instead, when the control switch was positioned to OPEN, the valve overload alarm was received. The Control room Operator checked the amperage indication for the 125 VDC A Battery Charger and found it to be approximately 13 amps higher than normal.

Normally, upon control switch actuation, "seal in" contacts from either the OPEN or CLOSE coil will cause the motor to be energized until limit switch actuation (during the OPEN stroke) or torque switch actuation (during the CLOSE stroke) deenergizes the motor. In this case, due to the condition that existed, insufficient voltage was present at the motor terminals to cause motor operation and the valve remained closed. After recognizing that valve motion was not occurring, the breaker for the motor operated valve (MOV) was manually opened. The elapsed time from control switch actuation until breaker opening was approximately 2 minutes.

An operator was dispatched to the steam tunnel door to determine if any odor could be detected that would be indicative of an overheated motor. None was apparent. Due to the steam tunnel being a very high radiation area at full power, an entry into the tunnel was not made. With no indication that the motor had burned up, the MOV power supply breaker was re-closed. At 1:51 a.m., a second attempt was made to open the valve. Valve actuation was successful. Unlike the first attempt, when the control switch for the valve was positioned to OPEN, no valve overload alarm was received. While opening, 125 VDC A Battery Charger amperage was noted to be 3-5 amps higher than normal.

At 3:43 a.m., following further investigation into operation of the valve and its behavior during testing, the RCIC System was declared inoperable. At 3:44 a.m., RCIC-MOV-M016 was closed to assure compliance with Primary Containment isolation requirements prescribed in Technical Specifications, and at 3:53 a.m., the MOV power supply breaker was opened.

B. Plant Status

Operating at approximately 100 percent power under normal operating conditions.

C. Reliability

Declaration of the RCIC System, considered to be a single train safety system, as being inoperable is being reported in accordance with 10CFR50.73(a)(2)(v). The RCIC System is considered to be a single train safety system because credit is taken for its actuation in the Loss of Feedwater operational transient analysis.

LICENSEE EVENT REPORT (LER),
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

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Cooper Nuclear Station

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

D. Cause

Equipment Deficiency. At some time subsequent to startup from the 1991 Refueling Outage, a packing leak developed on RCIC-MOV-MO16. The leak was discovered during maintenance as a result of this failure when the valve was manually opened by the electricians using the handwheel in preparation for performing a rotation check of the newly installed motor. A review of maintenance records revealed that during the 1991 Refueling Outage, the packing gland had been adjusted, in lieu of the valve being repacked (or packing being added). A check was made of the valve at operating pressure and no gland leakage was noted. Flexible steel conduit, installed to protect wiring between the valve operator limit switch compartment and the nearby terminal box, is routed in close proximity to the valve bonnet. While performing repairs, a hair-line crack was found in the conduit near the limit switch compartment. This breach in the conduit allowed entry of moisture from the valve packing leak into the conduit. Condensation accumulated inside the limit switch compartment of the MOV and in the nearby terminal box, resulting in wetting of the limit switch contacts and degradation of the terminal blocks in the terminal box.

E. Safety Significance

RCIC-MOV-MO16 is one of two Primary Containment Isolation Valves installed in the steam supply line to the RCIC turbine. Both valves are normally open. The inboard valve, RCIC-MOV-MO15, was unaffected by the packing gland steam leakage. Therefore, had isolation of the RCIC System been required with the system in service, and had the accumulation of water in the terminal box and/or RCIC-MOV-MO16 limit switch compartment caused the motor operator to fail, the penetration would have been isolated through closure of the inboard valve. Therefore, from the perspective of Primary Containment Isolation, while the isolation feature was potentially degraded, there was minimal safety significance due to the capability of the redundant inboard valve to perform the isolation function.

Credit is taken for operation of the RCIC System to maintain coolant inventory in the Loss of Feedwater operational transient analysis. This function of the RCIC System is backed up by the High Pressure Coolant Injection (HPCI) System. The packing gland leakage of RCIC-MOV-MO16 did not affect the HPCI System. Therefore, while the ability to maintain coolant inventory during the Loss of Feedwater operational transient could have been degraded had RCIC-MOV-MO16 been closed when the loss of feedwater operational transient occurred, there was minimal safety significance since the function could have been performed by the HPCI System. Note that no credit is taken for operation of the RCIC System for accident analysis purposes.

F. Safety Implications

The plant response to a Loss of Feedwater operational transient or to the Primary Containment Isolation function is most critical with the plant in operation at full power, as it was when the deficiency with RCIC-MOV-MO16 occurred.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (F-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Cooler Nuclear Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 8	LER NUMBER (6)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

G. Corrective Actions

On July 15, 1992, at 10:05 p.m., a load reduction, for ALARA purposes, from 780 to 550 MWe was started to provide for entry into the steam tunnel for maintenance on RCIC-MOV-MO16. As maintenance and repair activities continued on during the next day, at 9:00 a.m., power was reduced further to 460 MWe. On July 16, 1992, at 12:14 a.m., RCIC-MOV-MO15 was closed, isolating RCIC-MOV-MO16. The MOV motor was replaced, the limit switch compartment internals were dried out, and limit switch operation was checked and adjusted, as necessary. The degraded terminal blocks were replaced. In order to provide a drain path for any future accumulation of moisture in the MOV, a tee drain was installed on the limit switch compartment cover. A shield was installed around the conduit in the immediate vicinity of the MOV, effectively patching the cracked conduit and providing protection should further packing gland leakage occur. The conduit will be replaced during the 1993 Refueling Outage.

With regard to the valve, packing was added and adjustments to the packing gland were made to eliminate leakage. At 6:00 p.m., RCIC-MOV-MO15 was reopened to pressurize RCIC-MOV-MO16, and the inspection revealed no packing gland leakage. Subsequent inspections have been conducted and have revealed no leakage.

Post maintenance testing, including stroke and timing checks, running and torque-in amps and diagnostic baseline testing was performed satisfactorily. On July 17, 1992, at 2:35 p.m., the RCIC System was restored to standby service and declared operable.

During the 1993 Refueling Outage, an inspection will be performed to identify similar MOV installations where flexible conduit containing motor operator leads is in close proximity to valve packing glands and therefore potentially susceptible to this same failure scenario. Appropriate preventive measures will be taken to preclude similar occurrence.

H. Similar Events

On June 21, 1992, indications of a DC ground on the A 125 VDC Bus, including 125 VDC Bus A voltage drift and 125 VDC A Switchgear and A Battery Charger ground indications, were received. Preliminary troubleshooting and ground isolation revealed a slight ground on RCIC-MO-MO16. On June 25, SP 6.3.6.2, RCIC Valve Operability was performed on RCIC-MO-MO16 only. Ground alarms were received and changed state when the valve was cycled.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 5/0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-630), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Cooper Nuclear Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 8	LER NUMBER (6)			PAGE (3)	
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TEXT (If more space is required, use additional NRC Form 366A's) (17)

H. Similar Events (Continued)

On June 28, 1992, at 1:00 a.m., the RCIC System was declared inoperable for maintenance, and power was reduced for ALARA purposes to 460 MWe to facilitate entry into the steam tunnel for troubleshooting and repair efforts. The inboard steam isolation valve, RCIC-MOV-M015 was closed at this time, to isolate RCIC-MOV-M016. Electrical Maintenance personnel entered the steam tunnel at 2:25 a.m. The limit switch cover was removed and water was found. The contacts were dried out and cleaned. One termination was re-taped. Based upon discussions with the electricians during a subsequent investigation of this event, there was no evidence of packing gland leakage. Instead, the source of the moisture was believed to be due to condensation formed inside the conduit caused by cold air from the HVAC System being blown directly on it in the hot steam tunnel environment. As a means of eliminating condensation formation inside the conduit, a shield was placed to deflect cold air flow from directly impinging on it. No direct evidence of a steam packing leak was found, thus no post maintenance check for leakage was made.