

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1): Cooper Nuclear Station
 DOCKET NUMBER (2): 0 5 1 0 0 0 2 9 8
 PAGE (3): 1 OF 0 4

TITLE (4): RHR Pump "B" Motor Ground Resulting from Worn Stator Field Coil Insulation Discovered Subsequent to an Unplanned Reactor Trip

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					
0	1	2	8	8	8	8	8	8	0	5	0	0	0	0
0	1	2	8	8	8	8	8	8	0	5	0	0	0	0

OPERATING MODE (9): N

POWER LEVEL (10): 0, 0, 0

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

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(c)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.406(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"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(vi)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.406(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(vii)(A)	
<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(vii)(B)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(c)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12):

NAME: Donald L. Reeves, Jr.
 TELEPHONE NUMBER: 4 0 2 8 2 5 - 3 8 1 1

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPDOS
X	B	O	M	O	G	O	8	O	Y

SUPPLEMENTAL REPORT EXPECTED (14):

YES (If yes, complete EXPECTED SUBMISSION DATE):
 EXPECTED SUBMISSION DATE (15): 0 9 0 2 8 8

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

On January 28, 1988, subsequent to an unplanned reactor trip at 7:12 P.M. (LER 88-002), a ground alarm was received on the 1B Residual Heat Removal (RHR) Pump motor which had been in service prior to the scram. Approximately two (2) minutes later, the pump tripped. About three (3) hours later, with post scram recovery activities in progress, an attempt was made to restart the 1B RHR Pump; however, the ground condition was annunciated and the pump immediately tripped. Following further operational investigations, the pump was declared inoperable and, shortly thereafter, a plant cooldown was initiated.

On-site testing was performed to verify the motor fault, after which the motor was removed and transported to the General Electric Contaminated Equipment Repair Facility in Memphis, TN, to facilitate a detailed inspection. The ground condition was determined to be due to worn insulation in one specific area of the bottom surge ring/stator field coil assembly. At this time, the exact cause of the worn insulation is unknown and will be the subject of a supplementary report. This voluntary report is submitted as an item of industry interest.

To enable plant restart, in-place diagnostic testing to assure operability of the remaining three (3) identical RHR Pump motors and the two (2) Core Spray Pump motors was performed. These results were satisfactory. Additionally, a fully qualified replacement motor for the 1B RHR Pump was installed, restoring the RHR System to full operability.

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TEXT (if more space is required, use additional NRC Form 366A (1))

A. Event Description

On January 28, 1988, subsequent to an unplanned reactor trip at 7:12 P.M. (LER 88-002), a ground alarm was received on the 1B Residual Heat Removal (RHR) Pump motor, resulting in a motor trip on overload. The sequence of events leading up to this discovery was as follows.

Approximately two (2) hours prior to the aforementioned reactor trip, the 1B RHR Pump had been placed in service to transfer water from the Suppression Pool (Torus) to the Radioactive Waste Facility (Radwaste) for subsequent processing and return to the Condensate Storage Tank. This activity is one that is normally conducted on a weekly basis to maintain Torus water quality. When the unplanned reactor trip occurred, the 1B RHR Pump was operating. In reconstructing the sequence of events associated with the motor fault, a ground alarm was received on the 1B RHR Pump Motor immediately following the unplanned scram and turbine trip. Approximately two minutes later, the 1B RHR Pump tripped. Subsequently, noting that the pump was tripped, the valve lineup for transferring water from the Torus to Radwaste was returned to normal. About three (3) hours later, with plant conditions stabilized and maintenance activities related to the scram in progress, an attempt was made to start the 1B RHR Pump and resume transferring water from the Torus to Radwaste. However, upon attempting to restart the pump, the ground alarm was received and the pump tripped. At 10:08 P.M., following further operational investigations, the pump was declared inoperable, and shortly thereafter, a plant cooldown was initiated.

B. Plant Status

Shutdown, maintaining the reactor in a hot standby condition, with maintenance activities in progress related to the previously noted scram.

C. Basis for Report

An item which may be of interest industry wide.

D. Cause

A thorough inspection of the motor, a vertical, 1250 HP, 4000V AC, 60 Hz, 3-Phase induction motor, Model Number 5K6346XC74A, manufactured by General Electric Company, revealed that the fault condition was due to worn insulation in one specific area of the bottom surge ring/stator field coil assembly. The point of contact where the failure occurred was a single location, approximately 1/16 inch in diameter. The exact cause of the worn insulation is, at this time, unknown. Plans are to issue a supplementary report providing more information regarding the failure mode when such information is made available by the manufacturer.

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

E. Safety Significance

None. The design of the RHR System incorporates two redundant, independent subsystems, each with two identical pumps. In the event that one pump in one subsystem is inoperable, plant operation may continue for up to thirty (30) days providing all other active components of the RHR (Low Pressure Coolant Injection [LPCI]) subsystems and all active components of both Core Spray subsystems and the Diesel Generators are operable (Technical Specifications, Paragraph 3.5.A.4).

F. Corrective Action

The pump motor manufacturer, General Electric Company, was immediately contacted and advised of the 1B RHR Pump motor apparent ground fault. Assistance requested included investigation and evaluation of the failed motor, technical assistance with regard to locating and installing a replacement pump motor (required prior to plant restart), and technical guidance associated with verifying the operability of the remaining three (3) RHR Pump Motors and the two (2) Core Spray Pump Motors which are identical to the failed motor.

With regard to the 1B PWR Pump motor, following performance of on-site testing which confirmed the existence of a motor fault, the motor was removed and transported to the General Electric Contaminated Equipment Repair Facility, located in Memphis, Tennessee. There, a detailed inspection of the failed motor stator was performed which resulted in the determination noted in Paragraph D.

To enable plant restart, the following actions were taken with respect to the RHR (LPCI) System so as to assure operability of both subsystems, required by Technical Specifications, Paragraph 3.5.A.3.

1. A suitable replacement motor was obtained and installed as authorized by Design Change 88-071, RHR Pump Motor 1B Replacement. The mechanical and electrical characteristics of the replacement motor, Model Number 5K6339XC185A, manufactured by General Electric, are virtually identical to the original motor. To provide for installation, a slight modification to the motor mounting to accommodate a smaller diameter bolt circle was required.
2. To provide assurance that the existing motors, identical to the failed motor and installed on the remaining three (3) RHR Pumps and the two (2) Core Spray Pumps were operable, in place diagnostic testing was performed as recommended by General Electric. First, a Dielectric Absorption Test was conducted on all five (5) motors. The results indicated that the insulation condition was acceptable and that there was no indication of an incipient insulation problem. Secondly, high potential testing (high-potting) was performed on the C & D RHR Pump motors.

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		8 8	0 0 3	0 0	0 4	OF	0 4

TEXT (if more space is required, use additional NRC Form 366A (2) (17))

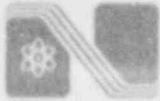
Those specific motors were selected on the basis that they enveloped the "worst case" combination of motor starts, operating hours and previous surge ring bracket conditions for the five (5) motors. The results of the high-potting performed at a voltage of 10,200 volts DC were satisfactory.

It should be noted that approximately one year ago, during a scheduled inspection of these motors, all four (4) RHR Pump motors and the 1A Core Spray Pump motor had been found with cracked/broken surge ring support brackets. No broken surge ring brackets were found in the 1B Core Spray Pump motor. The design of the brackets installed in that motor was different than the bracket design employed in the other five (5) motors. At that time, upgraded surge ring brackets of a new design, similar to those installed in the 1B Core Spray Pump motor, were installed and the stator coils were re-insulated (see LER 86-033, dated 12/16/86).

Based primarily upon the satisfactory inservice high-potting results on the "worst case" 1C and 1D RHR Pump motors, which could be extrapolated to the other three (3) pump motors based upon the results of the Dielectric Absorption Testing, the conclusion was reached that all five (5) motors should continue to be considered operable and that they will be available to perform their required safety related function.

G. Past Similar Events

No failure of this type has previously occurred.



Nebraska Public Power District

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CNSS886012

March 9, 1988

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

Dear Sir:

Cooper Nuclear Station Licensee Event Report 88-003 is forwarded as an attachment to this letter.

Sincerely,

G. R. Horn
Division Manager of
Nuclear Operations
Cooper Nuclear Station

GRH:sg

Attachment

cc: R. D. Martin
L. G. Kunc1
K. C. Walden
C. M. Kuta
R. J. Singer
INPO Records Center
ANI Library
NRC Resident Inspector

JER2
1/1