



## Nebraska Public Power District

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

CNSS933224

September 22, 1993

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

Dear Sir:

Cooper Nuclear Station Licensee Event Report 93-032, Revision 0, is forwarded as an attachment to this letter.

Sincerely,

R. L. Gardner  
Plant Manager

RLG/ju

Attachment

cc: J. L. Milhoan  
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 StationDOCKET NUMBER (2)  
0 5 0 0 0 2 1 9 8 1 OF 0 4TITLE (4)  
125 Volt Battery Disconnect Switch Fuse Failure Caused By A Manufacturing Defect Resulting In Inoperability Of The B 125 Volt Battery SystemEVENT DATE (5)  
MONTH DAY YEAR  
0 7 0 8 9 3 9 3  
LER NUMBER (6)  
YEAR SEQUENTIAL NUMBER REVISION NUMBER  
0 3 2 0 0  
REPORT DATE (7)  
MONTH DAY YEAR  
0 9 2 2 9 3  
OTHER FACILITIES INVOLVED (8)  
FACILITY NAMES  
DOCKET NUMBER(S)  
0 5 0 0 0  
0 5 0 0 0OPERATING MODE (9)  
N  
POWER LEVEL (10)  
0 0 0  
THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 50. (Check one or more of the following) (11)  
20.402(b) 20.405(c) 50.73(e)(2)(iv) 73.71(b)  
20.405(a)(1)(i) 50.36(c)(1) 50.73(e)(2)(v) 73.71(c)  
20.405(a)(1)(ii) 50.36(c)(2) 50.73(e)(2)(vii) OTHER (Specify in Abstract below and in Text, NRC Form 366A)  
20.405(a)(1)(iii) X 50.73(e)(2)(i) 50.73(e)(2)(viii)(A)  
20.405(a)(1)(iv) 50.73(e)(2)(ii) 50.73(e)(2)(viii)(B)  
20.405(a)(1)(v) 50.73(e)(2)(iii) 50.73(e)(2)(x)LICENSEE CONTACT FOR THIS LER (12)  
NAME  
Donald L. Reeves, Jr.  
TELEPHONE NUMBER  
AREA CODE  
4 0 2 8 2 5 - 3 8 1 1COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)  
CAUSE SYSTEM COMPONENT MANUFACTURER REPORTABLE TO NPDs  
B E J F U B 5 7 9 YSUPPLEMENTAL REPORT EXPECTED (14)  
YES (If yes, complete EXPECTED SUBMISSION DATE) X NO  
EXPECTED SUBMISSION DATE (15)  
MONTH DAY YEAR

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

On July 8, 1993, at 7:47 am, the Reactor Vessel head vent valves were closed in preparation for performance of the ASME Class 1-N System Leakage Test. Vessel pressure was subsequently increased as specified by the test procedure. Technical Specifications required both 125 Volt Battery Systems to be operable during the test. However, an investigation into an unrelated problem on July 12 revealed that at the time of the leakage test, the B 125 Volt Battery System was inoperable due to a defective disconnect fuse.

On August 23, when tested under load, the fuse acted intermittently, allowing only momentary current flow. Subsequent inspection by the manufacturer revealed the fuse defect to be due to a manufacturing deficiency. The solder connection between some of the fuse elements to the end bell was inadequate. The manufacturer considered the problem to be an isolated occurrence; however, new design units are available with improved solder connections.

The defective fuse was replaced and the battery was returned to service. The spare fuses that were of the same age as the failed unit were tested and determined to be satisfactory. Parallel operation of the C Chargers with the A 125V and both 250V Battery Systems was performed, indicating acceptability of the remaining installed fuses for continued operation. No other similar fuses are installed. During the next scheduled outage, these fuses will be replaced with ones fabricated with improved solder connections.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Cooper Nuclear Station	0 5 0 0 0 2 9 8 9 3	—	0 3 2	—	0 0 0	2	OF 0 4

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

A. Event Description

On July 8, 1993, at 7:47 am, the Reactor Vessel head vent valves were closed in preparation for performance of the ASME Class 1-N System Leakage Test. Vessel pressure was subsequently increased as specified by the test procedure. Based upon Technical Specification operability requirements, both 125 Volt Battery Systems should have been available at that time. However, an investigation into an unrelated problem performed subsequent to completion of the leakage test revealed that during testing, the B 125 Volt Battery System had actually been inoperable. The circumstances leading to this determination are as follows.

On the preceding day, July 7, following removal of the load sharing circuit between the three 125 VDC chargers, two unsuccessful attempts had been made to parallel the C 125 VDC Charger with the B Charger which was aligned to and in service with the B 125 Volt Battery System. Considering the problem to be associated with the C Charger, the B Charger remained in service and action was initiated to further investigate the C Charger. The next day, another attempt was made to parallel the C Charger with the B Charger with the same results. A Work Item was written and special instructions were developed by Engineering to investigate the concern. On July 12, the investigation was performed. One of the two fuses for the B 125 Volt Battery Output Breaker fused disconnect exhibited a high internal resistance and was replaced. Following fuse replacement, parallel operation of the chargers was satisfactorily achieved.

On August 23, when tested under load, the fuse functioned intermittently, allowing only momentary current flow. Subsequent inspection by the manufacturer in a report dated September 1 revealed that the solder connection between some of the fuse elements to the end bell was inadequate.

Consequently, on July 8, the B 125 Volt Battery System was inoperable. Closure of the head vent valves constituted a change in the operational condition of the plant from the Cold Shutdown condition to a condition requiring both Core Spray (CS) and the Low Pressure Coolant Injection (LPCI) mode of the Residual Heat Removal (RHR) System to be operable. Conservatively assuming that the B 125 Volt Battery System was totally inoperable, control power for the B CS and both the C and D RHR pump breakers would not have been available. Consequently, Technical Specification requirements associated with system operability for the change in plant condition were not achieved.

B. Plant Status

At the time when the head vent valves were closed, resulting in a plant condition change, the 1993 Refueling Outage was nearing completion and outage recovery activities were in progress.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

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

C. Basis for Report

Non-compliance with Technical Specification operability requirements upon changing plant conditions, reportable in accordance with 10CFR50.73(a)(2)(1)(B) as a condition prohibited by Technical Specifications. This condition was determined to be reportable on September 8 following a review of the manufacturer's report, the inspection and maintenance actions taken in July and the plant conditions that existed at the time.

D. Cause

Manufacturing deficiency. An evaluation by the manufacturer revealed that the solder connections of some elements to the fuse end bell was inadequate. The manufacturer considered the problem to be an isolated occurrence.

E. Safety Significance

Based upon satisfactory fuse performance exhibited while charging the battery following the battery service test performed during the 1993 Refueling Outage on March 13, had an event occurred during the past operating cycle requiring the B 125 Volt Battery System to function in its design capacity, the unit would have been available and would have performed satisfactorily.

Technical Specifications require that both CS Subsystems and the LPCI mode of both RHR Subsystems be operable when there is irradiated fuel in the vessel and when the reactor vessel pressure is greater than atmospheric. With regard to the condition found, except when the leakage test was performed, starting at 7:47 am on July 8 and ending at 10:25 pm on July 9, the reactor vessel head vent valves were open and the reactor vessel was at atmospheric pressure. Conservatively assuming that during the test, the B 125 Volt Battery System was non-functional due to the defective fuse, 1) only one of the two CS Subsystems would have been available for actuation either automatically or from the Control Room, and 2) while both RHR Subsystems would have been available, redundant pumps within each subsystem would not have been available either automatically or from the Control Room. Breaker actuation, however, powering these pumps, would have been possible locally. Consequently, while the desired redundancy in Core Standby Cooling System availability with reactor vessel pressure greater than atmospheric would not have been immediately available, operator action in accordance with existing procedural guidance could have been taken to actuate the redundant pumps.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT (If more space is required, use additional NRC Form 365A's) (17)

F. Safety Implications

Inoperability of one of the two 125 Volt Battery Systems would be most significant with the plant initially at full power. Had a design basis accident occurred when this condition existed, none of the loads supplied by the B 125 Volt Battery Systems would have been available. Complete loss of one of the two 125 V DC Battery Systems has been analyzed, however, and is within the CNS licensing basis.

G. Corrective Action

The defective fuse was replaced and, as previously noted, following testing, was sent to the manufacturer for evaluation. The report dated September 1, specified the defect to be inadequate solder connections of some elements to the fuse end bell.

On site testing consisted of measuring the resistance of the fuse removed from the battery breaker and three spare fuses from the warehouse. Whereas the spare fuses exhibited resistance in the 40 micro-ohm range, the fuse removed from the breaker exhibited a resistance around 2000 micro-ohms. Additionally, each of the fuses, rated at 1350 amperes, was tested for current carrying capacity at 300 amperes. The three spare fuses tested satisfactorily; the fuse removed from the B 125 Volt Battery System disconnect was unable to pass the 300 ampere current.

Parallel operation of the C Chargers with the A 125V and both 250V Battery Systems was performed, indicating acceptability of the remaining installed fuses for continued operation. No other similar fuses are installed. During the next scheduled outage, these fuses will be replaced with ones fabricated with improved solder connections.

With regard to the manufacturer, they stated in the report that they would continue to monitor internal processes and analyze field returns for any indication of trends and the identification of non-conformances, root causes and corrective actions.

H. Similar Events

None

I. Supplemental Information

Manufacturer: Cooper Bussmann  
Part Number: KRP-C-1350  
Capacity: 1350 amperes