



**Commonwealth Edison**

Quad Cities Nuclear Power Station  
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Cordova, Illinois 61242-9740  
Telephone 309/654-2241

RLB-93-108

August 13, 1993

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

Reference: Quad Cities Nuclear Power Station  
Docket Number 50-254, DPR-29, Unit One

Enclosed is Licensee Event Report (LER) 93-011, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(i)(B). The licensee shall report any operation or condition prohibited by the plant's Technical Specification.

Respectfully,

COMMONWEALTH EDISON COMPANY  
QUAD CITIES NUCLEAR POWER STATION

R. L. Bax  
Station Manger

RLB/TB/plm

Enclosure

cc: J. Schrage  
T. Taylor  
INPO Records Center  
NRC Region III

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LICENSEE EVENT REPORT (LER)

Form Rev. 2.0

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|--|--------|--|---|---------------------|-------|---|-----------|-------------------|--|--------------------------------------|--------|--|--------------|----------------------|-----|-------------|--|-------------|--|----------------|--|-----------------|--|------------------|--|-----------------|--|----------------|--|-----------------|--|------------------|--|----------------------|--|----------------------|--|----------------|--|----------|--|----------|--|---|--|
| Facility Name (1)<br>Quad Cities Unit One  |        |  |   |                     |       |   |           |                   |  | Docket Number (2)<br>0 5 0 0 0 2 5 4 |        |  |              | Page (3)<br>1 of 0 5 |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| Title (4)<br>Unit One A Core Spray System Inop Due To Random Breaker Failure                     |        |  |   |                     |       |   |           |                   |  |                                      |        |  |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| Event Date (5)<br>Month: 07, Day: 21, Year: 93   |        |  | LER Number (6)<br>Year: 93, Sequential Number: 011, Revision Number: 00 |                     |       | Report Date (7)<br>Month: 08, Day: 18, Year: 93 |           |                   | Other Facilities Involved (8)<br>Docket Number(s): 0 5 0 0 0 |                                      |        |  |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| OPERATING MODE (9)<br>4  |        | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11) |   |                     |       |   |           |                   |  |                                      |        |  |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| POWER LEVEL (10)<br>2 5  |        | 20.402(h)  |   | 20.405(a)(1)(i)     |       | 20.405(a)(1)(ii)                                |           | 20.405(a)(1)(iii) |  | 20.405(a)(1)(iv)                     |        | 20.405(a)(1)(v)                                      |              | 20.405(c)            |     | 50.36(c)(1) |  | 50.36(c)(2) |  | 50.73(a)(2)(i) |  | 50.73(a)(2)(ii) |  | 50.73(a)(2)(iii) |  | 50.73(a)(2)(iv) |  | 50.73(a)(2)(v) |  | 50.73(a)(2)(vi) |  | 50.73(a)(2)(vii) |  | 50.73(a)(2)(viii)(A) |  | 50.73(a)(2)(viii)(B) |  | 50.73(a)(2)(x) |  | 73.71(b) |  | 73.71(c) |  | Other (Specify in Abstract below and in Text) |  |
| LICENSEE CONTACT FOR THIS LER (12)   |        |  |   |                     |       |   |           |                   |  |                                      |        |  |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| NAME<br>Mark L. Huhn   |        |  |   |                     |       | Ext. 2117                                       |           |                   |  |                                      |        | TELEPHONE NUMBER<br>AREA CODE: 3 0 9 6 5 4 - 2 2 4 1 |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)                       |        |  |   |                     |       |   |           |                   |  |                                      |        |  |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| CAUSE  | SYSTEM | COMPONENT  | MANUFACTURER  | REPORTABLE TO NPRDS | CAUSE | SYSTEM  | COMPONENT | MANUFACTURER      | REPORTABLE TO NPRDS  | CAUSE                                | SYSTEM | COMPONENT  | MANUFACTURER | REPORTABLE TO NPRDS  |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| Y  | B      | BM   | BKR   | Y                   |       |   |           |                   |  |                                      |        |  |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |
| SUPPLEMENTAL 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) |        |  |   |                     |       |   |           |                   |  |                                      |        |  |              |                      |     |             |  |             |  |                |  |                 |  |                  |  |                 |  |                |  |                 |  |                  |  |                      |  |                      |  |                |  |          |  |          |  |   |  |

A. ABSTRACT:

At 0917 hours on July 21, 1993, Unit One was in the RUN mode at 25 percent of rated core thermal power. It was discovered that 4KV breaker [BKR] #68, feeding the 1B Core Spray [BM] Pump Motor, was open and discharged. This resulted in the 1B Core Spray loop being declared inoperable. Since the High Pressure Coolant Injection System [BJ] (HPCI) was also inoperable at the time, this placed Unit One in a 24 hour Limiting Condition for Operation (LCO) per Technical Specification section 3.5.C.4.

The breaker was changed out and the 1B Core Spray loop was tested satisfactorily and the LCO was exited at 1017 on July 21, 1993. Troubleshooting indicated the breaker malfunction was caused by a random component failure of the 52-SM/LS (Spring Monitor Limit Switch) switch [33]. This prevented the breaker from recharging because this switch controls the operation of the charging motor.

Since this condition was determined to have existed prior to reactor startup, this report is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(b) due to unintentional operation outside of Technical Specification section 3.5.A.1.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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|---|---|----------------|----------------------|--------------------|----------|
| FACILITY NAME (1)<br><br>Quad Cities Unit One   | DOCKET NUMBER (2)<br><br>0 5 10 10 10 2 5 4 | LER NUMBER (6) |                      |                    | PAGE (3) |
|   |   | Year           | Sequential<br>Number | Revision<br>Number |          |
|   |   | 9 3            | - 0 1 1              | - 0 10             | 2 OF 10  |
| TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX] |   |                |                      |                    |          |

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power.

EVENT IDENTIFICATION: Unit One A Core Spray System inop due to random breaker failure.

A. CONDITIONS PRIOR TO EVENT:

|                 |                           |                  |
|-----------------|---------------------------|------------------|
| Unit: One       | Event Date: July 21, 1993 | Event Time: 0917 |
| Reactor Mode: 4 | Mode Name: Run            | Power Level: 25% |

This report was initiated by Licensee Report 254/93-011.

RUN (4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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| FACILITY NAME (1)    | DOCKET NUMBER (2)      | LER NUMBER (6) |                   |                 | PAGE (3) |
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| Quad Cities Unit One | 0 15 10 10 10 12 15 14 | 9 13           | 0 11 11           | 0 0 2           | OF 0 15  |

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

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A. CONDITIONS PRIOR TO EVENT:

Unit: One                                      Event Date: July 21, 1993      Event Time: 0917  
 Reactor Mode: 4                                  Mode Name: Run                          Power Level: 25%

This report was initiated by Licensee Report 254/93-011.

RUN (4) - In this position the reactor system pressure is at or above 825 psig, and the reactor protection system is energized, with APRM protection and RBM interlocks in service (excluding the 15% high flux scram).

B. DESCRIPTION OF EVENT:

On July 21, 1993 at 0917, Unit One was in the RUN mode at 25 percent of rated core thermal power. An operator, while performing rounds, discovered that 4KV breaker [BKR] #68, feeding the 1B Core Spray [BM] Pump Motor, was open and discharged. The normal configuration is open and charged. This condition resulted in the 1B Core Spray system being declared inoperable. Since the High Pressure Coolant Injection [BJ](HPCI) system was also inoperable at the time, this placed Unit One in a 24 LCO per Technical Specification section 3.5.C.4.

It was determined that the only time the breaker could have been discharged was following Core Spray system testing at 0245 hours on July 20, 1993. Unit One reactor startup commenced at 0435 hours on July 20, 1993. Technical Specification section 3.5.A.1 states that, "Both core spray subsystems shall be operable whenever irradiated fuel is in the reactor vessel and prior to reactor startup from a cold condition." Since the unit was started up with one of the Core Spray loops inoperable, this resulted in operation outside of Technical Specification section 3.5.A.1, and this report is being submitted in accordance with 10 CFR 50.73(a)(2)(i)(b).

In order to restore the 1B Core Spray system to operability, the Operations department attempted unsuccessfully to recharge the breaker. The Electrical Maintenance (EM) department was contacted to assist in the breaker troubleshooting. Since Unit Two was in cold shutdown, the breaker for the 2B Core Spray pump cubicle from bus 24-1 was installed in the bus 14-1 cubicle for the 1B Core Spray Pump. Following breaker replacement, QCOS 1400-4, Monthly Core Spray Pump Operability, was performed satisfactorily to prove operability of the 1B core spray system. The LCO was exited at 1017 on July 21, 1993.

| FACILITY NAME (1)    | DOCKET NUMBER (2)   | LER NUMBER (6) |   |                   |   |                 |    | PAGE (3) |   |    |   |    |    |    |
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|                      |                     | Year           |   | Sequential Number |   | Revision Number |    |          |   |    |   |    |    |    |
| Quad Cities Unit One | 0 5 10 10 10 2 15 4 | 9              | 3 | -                 | 0 | 11              | 11 | -        | 0 | 10 | 3 | OF | 10 | 15 |

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

C. APPARENT CAUSE OF EVENT:

The cause for operation outside of Technical Specification section 3.5.A.1. is due to an inadequate procedure. Currently, no requirement exists to inspect the Core Spray pump breakers following the performance of operability surveillances. A breaker inspection is performed daily by Equipment Operators (EO). This inspection did not occur during the short time between system testing at 0235 hours and reactor startup at 0445 hours on July 20, 1993.

An apparent contributing cause is due to personnel error in the form of lack of attention to detail. The breaker was discovered uncharged at 0917 hours on July 21, 1993. Operator surveillance sheets for July 20 indicate that this breaker was verified to be charged on shift 3 (1500-2300). Based on the only possible discharge mode available for the breaker charging spring, the system operability test completed at 0235 on July 20, it appears that the uncharged breaker condition was overlooked by the operator during the shift three rounds on July 20. This event was discussed with the operator who performed the shift three rounds on July 20. He said he inspects both the toggle switch and the breaker status window, and was unable to explain why he did not identify the uncharged breaker.

The cause of the breaker malfunction was due to a random component failure of one of the breaker charging motor switches.

D. SAFETY ANALYSIS OF EVENT:

The safety significance of this event was minimal. The A loop of Core Spray was operable throughout the time period that the B loop was considered inoperable. One loop of Core Spray is sufficient to accomplish the intended safety function of the Core Spray system. Also, both loops of the Low Pressure Coolant Injection [BO](LPCI) system were operable.

Since HPCI was also inoperable at the time the Core Spray loop was determined to be inoperable, Unit One entered a 24 LCO per Technical Specification section 3.5.C.4.

E. CORRECTIVE ACTIONS:

The immediate corrective action was to declare the 1B Core Spray loop inoperable and write a work request to investigate and repair.

Currently the breaker status windows, which indicate if the breaker is charged or uncharged, are not consistent with respect to window color. The "Charged" windows are either yellow or red while the "Uncharged" windows are black. The charged window colors will be standardized in order to make it more apparent when one of the breakers is uncharged. A procedure change will be processed to standardize the window colors as part of the normally scheduled breaker PM program per QCEPM 200-1, Inspection and Maintenance of 4KV Horizontal Circuit Breakers Type 4.76-250 (NTS# 2541809301101).

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| Quad Cities Unit One | 0 5 10 10 12 15 14 | 9 3            | - 0 11 11         | - 0 10          | 4 OF 15  |

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

Troubleshooting was performed on the failed breaker under Work request Q08741. The faulty breaker was replaced with the breaker from the 2B Core Spray Pump and the Monthly Core Spray surveillance was performed and the LCO was exited. During initial inspection, it was determined that the 52-SM/LS (Spring Monitor Limit Switch) switch contacts 1 and 2 were open. This is a normally open switch which is actuated when the breaker springs are discharged. Switch contacts 1 and 2 close to supply power to the breaker charging motor and open to remove power from the motor when the breaker springs are charged. The failed breaker was manually charged and the switch operated well enough for breaker operation in subsequent attempts. Failure of the breaker to operate is directly attributable to the intermittent operation of the 52-SM/LS contacts 1 and 2. This switch was disassembled and it was found that the contact carrier had melted due to overcurrent. The melted contact carrier caused a misalignment of the contact points preventing the switch from actuating to supply power to the breaker charging motor. An additional switch in series to the 52-SM/LS switch was inspected and did not show any similar damage leading to a conclusion that this was a random failure of the 52-SM/LS switch.

While this event was considered a random failure, the EM department checked similar switches on this breaker and found three of them to have erratic resistance readings. The switches appeared to have a dirt accumulation that would wipe clean with repeated cycling. These switches were replaced with spares.

As a result of this event, the EM department will incorporate into QCEPM 200-1, Inspection and Maintenance of 4KV Horizontal Circuit Breakers Type 4.76-250, a requirement to perform resistance checks on these switches as part of future breaker inspections (NTS# 2541809301102).

The failed switch on this breaker was original equipment. Based on this fact and the results of the previous events search for this type of failure, no further corrective actions are necessary at this time.

Procedure changes will be processed to require the inspection of ECCS Pump breakers following operability testing.

#### F. PREVIOUS EVENTS:

A TJM search on all items with an "S35-" equipment code (breakers) did not indicate any related failures. The replacement switches had to be obtained from Dresden Station because they had not been stocked at Quad Cities with the required safety classification since the parts classification program began in 1988, indicating zero usage during that period.

A Nuclear Plant Reliability Data System (NPRDS) nationwide search was conducted for 4KV breaker failures, Model ID no. AMH-4.76-250, dating back to 1988. Two events were identified which were caused by similar switch failures of the charging motor circuit, neither of which occurred at Quad Cities Station.

An LER previous events search for similar breaker failures revealed no similar events.

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|   |  | Year           | Sequential Number | Revision Number |                          |
|   |  | 9 3 -          | 0 1 1 -           | 0 0 5           |                          |

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G. COMPONENT FAILURE DATA:

This switch is a model CR2940U310 manufactured by General Electric.