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Quad Cities Nuclear Power Station
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RLB-90-227

September 10, 1990

U. S. Nuclear Regulatory Commission
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Washington, DC 20555

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

Enclosed is Licensee Event Report (LER) 90-016, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted as a voluntary report.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/MJB/jlg

Enclosure

cc: R. Stols
T. Taylor
INPO Records Center
NRC Region III



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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

| Facility Name (1) | Docket Number (2) | Page (3) |
|---|---|---|
| Quad Cities Unit One | 0 5 0 0 0 2 5 4 | 1 of 0 4 |

Title (4) Loss of 1/2A Diesel Fire Pump Due To Failure Of The Starting Relays, With 1/2B Diesel Fire Pump Out Of Service For Maintenance.

| 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) |
| | | | | | | | | | | Quad Cities | 0 5 0 0 0 2 6 5 |
| 0 8 | 0 9 | 9 0 | 9 0 | --- | 0 1 1 6 | --- 0 0 | 0 9 | 1 0 | 9 0 | | 0 5 0 0 0 |

| OPERATING MODE (9) | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11) | | | |
|---|---|---|---|---|---|
| 4 | | ___ 20.402(b) | ___ 20.405(c) | ___ 50.73(a)(2)(iv) | ___ 73.71(b) |
| POWER LEVEL (10) | 0 3 6 | ___ 20.405(a)(1)(i) | ___ 50.36(c)(1) | ___ 50.73(a)(2)(v) | ___ 73.71(c) |
| | | ___ 20.405(a)(1)(ii) | ___ 50.36(c)(2) | ___ 50.73(a)(2)(vii) | ___ Other (Specify in Abstract below and in Text) |
| | | ___ 20.405(a)(1)(iii) | ___ 50.73(a)(2)(i) | ___ 50.73(a)(2)(viii)(A) | |
| | | ___ 20.405(a)(1)(iv) | ___ 50.73(a)(2)(ii) | ___ 50.73(a)(2)(viii)(B) | |
| | | ___ 20.405(a)(1)(v) | ___ 50.73(a)(2)(iii) | ___ 50.73(a)(2)(x) | |

LICENSEE CONTACT FOR THIS LER (12)

| Name | TELEPHONE NUMBER |
|---|---|
| | AREA CODE |
| E. Hayden Smith, Technical Staff Ext. 2156 | 3 0 9 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 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| X | K P | R L Y | C 7 4 2 | N | | | | | | | |
| | | | | | | | | | | | |

| 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)


ABSTRACT:

On August 9, 1990, Units One and Two were in the RUN mode at 36 percent and 100 percent of rated core thermal power, respectively. At 1110 hours with the 1/2B Diesel Fire Pump (FP) out of service for maintenance on the discharge header relief valve, the 1/2A Diesel Fire Pump received an auto start signal, but failed to start due to failure of the starting relays. At 1140 hours, the service water crosstie valve was opened and a backup diesel driven pump was connected to the fire main in order to provide back up fire suppression water. The identical relief valve from the 1/2A Diesel Fire Pump was installed on the 1/2B Diesel Fire Pump in order to restore the 1/2 B system to an operable status on August 9, 1990, at 2212 hours. The 1/2A Diesel Fire Pump was repaired on August 16, 1990 by replacing the faulty relays and its relief valve. This report is submitted as a voluntary report.

PLANT AND SYSTEM IDENTIFICATION:

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

EVENT IDENTIFICATION: Loss of 1/2A Diesel Fire Pump Due To Failure of The Starting Relays, With 1/2B Diesel Fire Pump Out Of Service For Maintenance.

A. CONDITIONS PRIOR TO EVENT:

Unit: One | Event Date: August 9, 1990 | Event Time: 1110
Reactor Mode: 4 | Mode Name: RUN | Power Level: 33%

This report was initiated by Deviation Report D-4-1-90-069

RUN Mode (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 August 9, 1990, Units One and Two were in the RUN mode at 36 percent and 100 percent of rated core thermal power, respectively. These power levels correct the preliminary report, letter number RLB-90-206 dated August 10, 1990, which stated "Unit One was at 33 percent power and Unit Two was at 97 percent power". During the course of a return to service on the fire system, filling and venting of a new portion of the fire main system [KP] was being performed in order to hydrostatically test this new installation. At 1110 hours, during the fill and vent evolution, the fire main pressure dropped. The diesel fire pumps are designed to start once the pressure in the fire main drops below 65 psi, in order to maintain the operating pressure for the water based systems. When the pressure dropped below 65 psi the 1/2A Diesel Fire Pump failed to auto start.

Manual attempts to start the 1/2A pump were initiated from the control room as well as the local control panel with no success.

The 1/2B Diesel fire pump had been taken out of service on August 7, 1990 at 0155 hours in order to perform maintenance to the pump discharge header relief valve [RV]. Outage report QOA 4100-07, Single Fire Pump/Water Supply, was initiated at that time.

Therefore, with neither fire pump capable of starting, a backup fire suppression water system was required to be established within 24 hours per Technical Specification 3.12.B.3. The backup fire suppression water system was established by opening the service water crosstie valve 1/2-3906 and connecting one of the backup diesel driven pumps to the fire main. This was accomplished at 1140 hours on August 9, 1990 in accordance with QOA 4100-2, Fire Protection System Failure.

In order to return a fire pump to an operable condition, the discharge header relief valve from the 1/2A Diesel Fire Pump was installed on the 1/2B Diesel Fire Pump under work request Q83885 and the 1/2B pump was verified to be operable on August 9, 1990 at 2212 hours. The 1/2A Diesel Fire Pump was repaired under work requests Q86491 and Q86290 and returned to service on August 16, 1990 at 1715 hours.

C. APPARENT CAUSE OF EVENT:

This report is submitted as a voluntary report in order to satisfy Technical Specifications 3.12.B.3.

The cause of this event is the fact that the 1/2A Diesel Fire Pump failed to auto start and the 1/2B Diesel Fire Pump was out of service. The 1/2B Diesel Fire Pump had been taken out of service in order to perform maintenance on the discharge header relief valve.

The cause of the 1/2A Diesel Fire Pump's inability to start is component failure. The redundant Pilot Starter Control relays [RLY] PC1 and PC2, necessary to start the fire pump, were both found to be defective. The Electrical Maintenance (EM) department disassembled these relays in order to find the exact problem. It was discovered that on the PC1 relay the contact disc had separated from the coil armature which prevented the plunger from completing the circuit. The redundant relay, PC2, was found to have a broken wiring termination inside of the relay assembly.

Previously, on July 29, 1990 Work Request Q86290 was written because the 1/2A Diesel Fire Pump did not start on the first attempt while performing QOS 4100-1, Fire Pump Monthly Test. However, the pump did start on the second attempt and QOS 4100-1 was successfully completed. This suggested that a problem may have existed on one of the redundant starting circuits. The second relay failed before work on the first relay was scheduled.

D. SAFETY ANALYSIS OF EVENT:

The safety of the plant and the public were not affected by this event. The service water [BI] crosstie valve [V], 1/2-3906, was immediately opened in accordance with station procedure QOA 4100-2, and the 1/2B Diesel Fire Pump was returned to service at 2212 hours on August 9, 1990.

The service water crosstie can be electrically opened from the 912-1 panel [PL] in the control room to feed the fire protection water system. This system is capable of supplying adequate amounts of water to the fire system piping, but under normal operating conditions at a slightly lower pressure, 5-10 psi lower, than required by the most demanding sprinkler system [SRNK]. This reduction in pressure would cause the sprinkler discharge pattern at a remote system to be reduced to a small extent. To provide the additional header pressure needed, the station has two backup diesel driven pumps, one of which is required by procedure to be tied into the designated fire hydrant. Each of these pumps is rated at 140 psi which satisfies the most demanding fire system pressure requirement of 100 psi and satisfies the Technical Specification requirement for a backup fire suppression system.

E. CORRECTIVE ACTIONS:

The immediate corrective action was to open the service water crosstie valve, 1/2-3906, and connect one of the back-up diesel driven pumps to the fire main.

As further action, the relief valve was taken from the 1/2A Diesel Fire Pump and installed onto the 1/2B Diesel Fire Pump in order to return one of the diesel fire pumps to service. To restore the second diesel fire pump to service, relays for the starting unit of the 1/2A Diesel Fire Pump were replaced.

The possibility of the primary relay and the redundant relay failing at the same time is very unlikely. To prevent recurrence of this event, a preventative maintenance program will be established to change out these relays once every 3 years to reduce the possibility of mechanical failure within these relays. (NTS 2542009006901).

Appropriate Operating Department personnel will be instructed on this event placing emphasis on supplying as much information as possible when requesting work due to equipment starting problems. This will be accomplished at a tailgate meeting (NTS 2542009006902).

Appropriate Maintenance Department personnel will be instructed on this event placing emphasis on giving priority to work requests that involve equipment which fails to start. This will be accomplished at a tailgate meeting (NTS 2542009006903).

F. PREVIOUS EVENTS:

The previous events identified where both diesel fire pumps were unavailable are documented in Quad Cities Station Deviation reports 4-1-85-044, (A and B Fire Pump failure to meet required flow), 4-1-87-101, (Fire on 1/2B Fire Diesel), and 4-1-88-014, (Both Diesel Fire Pumps inoperable due to excess differential pressure on trash bars).

The cause of the previous events do not establish a trend of fire pump failures as they are unrelated. No DVRs have been written which address the type of relays which are used on the Diesel Fire Pumps.

G. COMPONENT FAILURE DATA:

The 1/2A and 1/2B Diesel Fire Pumps are a product of Cummins Marine Diesel, Model NHS 6 IF. The Relay pilot starter control (PC1) - Part #792142, and Relay pilot starter control (PC2) - Part #792142 are manufactured by Cummins Mid-States Power, Inc.