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ComEd

LWP-96-017

February 27, 1996

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) 96-004, Revision 0, 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)(v)(D). The licensee shall report any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

The following commitments are being made by this letter:

- Evaluate PM on 250V DC breakers to include a routine trip check of the breaker. During the investigation it was found that routine trip checks are not performed. This action will be completed by 08/30/96.
- Disassemble HPCI Gland Exhauster breaker to attempt to determine the root cause of its failure. This action will be completed by 06/30/96.
- Reevaluate replacement schedule for 250V DC breakers. This action will be completed by 06/30/96.

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If there are any questions or comments concerning this letter, please refer them to Nick Chrissotimos, Regulatory Assurance Administrator at 309-654-2241, ext. 3100.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

L. W. Pearce
Station Manager

LWP/NC/plm
Enclosure

cc: P. Piet
C. Miller
INPO Records Center
NRC Region III

Licensee Event Report
Reviewer Assignment Form

Revised 12/01/94

LER # 2541809600400 Date: January 30, 1996

Subject: Unit One HPCI inoperable due to Gland Exhauster Breaker Trip

Signatures of reviewers indicating review and approval of item:

Systems Eng. Supv:	Brian R Wallace 1 2/26/96 Date	/ Date
Operating Eng.:	Alex L. Marek 1 2/26/96 Date	/ Date
	/ Date	/ Date
	/ Date	/ Date

Approved: D.W. Foore 1 2/27/96
Station Manager/PORC Chairman Date

LER254\96\004.WPF

LICENSEE EVENT REPORT (LER) Form Rev. 2.0

Facility Name (1)	Docket Number (2)	Page (3)
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Title (4)

Unit One HPCI Inoperable Due To Gland Exhuaster Breaker 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	Docket Number(s)
0 1	3 0	9 6	9 6	-- 0 0 4	-- 0 0	0 2	2 7	9 6		0 5 0 0 0
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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)		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	Other (Specify
	9 2	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	in Abstract
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	below and in
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	Text)

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Nick Chrissotimos, Regulatory Assurance, Ext. 3100	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

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 January 30,1996 at 2127 hours during the performance of QCOS 2300-13, "HIGH PRESSURE COOLANT INJECTION (HPCI) MANUAL INITIATION TEST," the Unit 1 HPCI [BJ] system was declared inoperable. During the surveillance, the overload alarm on the HPCI Auxiliary Oil Pump (AOP) and the 250V DC Battery Undervoltage alarm annunciated. Additionally, the AOP cycled on and off several times during the surveillance. Despite these problems, the HPCI system achieved design flow within the required 45 seconds. On January 30, 1996 at 2235 an ENS notification of this event was made. Subsequent evaluation of these anomalies determined that the HPCI system would have performed its required design functions, if required. An investigation into the cause of these anomalies was performed and appropriate corrective actions taken.

On February 5, 1996, during operability testing following completion of corrective actions for the previously noted problems, the HPCI Gland Exhauster breaker tripped. NWR # 9600010647 was written to correct this problem. The HPCI system was inoperable due to this event due to the possibility of system isolation caused by high HPCI room temperatures during operation with a failed Gland Exhauster. The Unit 1 HPCI Gland Exhauster breaker was replaced by February 9, 1996 and the system was tested and declared operable.

PLANT AND SYSTEM IDENTIFICATION:

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

EVENT IDENTIFICATION Unit One HPCI inoperable due to Gland Exhauster.Breaker Trip.

A. CONDITIONS PRIOR TO EVENT

Unit: One Event Date: January 30, 1996 Event Time: 2127

Reactor Mode: 4 Mode Name: RUN Power Level: 92%

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. EVENT DESCRIPTION

On January 30,1996 at 2127 during the planned performance of QCOS 2300-13, "HIGH PRESSURE COOLANT INJECTION (HPCI) MANUAL INITIATION TEST" the Unit 1 (HPCI) [BJ] received an overload alarm from a relay in the Auxiliary Oil Pump (AOP) breaker. This relay has an alarm function only and did not cause the AOP to trip. The AOP cycled on and off several times, eventually running continuously. The 250 Volt Direct Current (VDC) Battery Undervoltage Alarm was received concurrent with the AOP overload alarm.

As directed by the annunciator procedure, the surveillance was discontinued. The HPCI system was shutdown and declared inoperable. A 4 hour Emergency Notification System phone call was made at 2235 in accordance with 10CFR 50.72(b)(2)(iii)(D).

Nuclear Work Request (NWR) #960008976 was written to troubleshoot the problems observed during the system start-up.

Analysis of the partial results obtained during the performance of the Manual Initiation Test on January 30, 1996 proved that the HPCI system would have performed its design function and therefore was not inoperable due to the problems noted during the surveillance.

On February 5, 1996, during operability testing following completion of corrective actions for the previously noted problems, the HPCI Gland Exhauster breaker tripped. NWR # 9600010647 was written to correct this problem. The HPCI system was inoperable due to this event due to the possibility of system isolation caused by high HPCI room temperatures during operation with a failed Gland Exhauster. The Unit 1 HPCI Gland Exhauster breaker was replaced by February 9, 1996 and the system was tested and declared operable.

C. APPARENT CAUSE OF THE EVENT

This event is being reported in accordance with 10CFR 50.73(a)(2)(V)(D) which requires reporting of any event which alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

There were three independent problems associated with this event. These three problems were: 1) Tripping of the HPCI Gland Exhauster breaker in preparation for operability testing on February 5, 1996, 2) HPCI Motor Overload and 250V DC Battery Undervoltage alarms annunciating during the manual initiation test on January 30, 1996, and 3) Cycling of the AOP during the manual initiation test on January 30, 1996. Only the failure of the HPCI Gland Exhauster made the system inoperable; however, the causes of each of these problems will be addressed separately below.

1. Tripping of the breaker for the HPCI Gland Exhauster just prior to operability testing on February 5, 1996.

   The cause of the Gland Exhauster trip was attributed to a malfunction of the Gland Exhauster breaker. The breaker was replaced and tested. This breaker had been installed in 1992. The breaker was removed and tested on February 6 & 7, 1996. Testing determined that the instantaneous trip setpoint had drifted and caused the breaker to trip at a lower in-rush current.

   The root cause for the beaker failure has not been determined. The breaker will be sent to the System Material Analysis Department for disassembly to attempt to determine the mode of failure.

2. HPCI Motor Overload and 250V DC Battery Undervoltage alarms annunciating during the manual initiation test

   On February 1, 1996 during troubleshooting into the AOP cycling problem the motor overload alarm again occurred when starting the AOP manually. The 250V DC Battery Undervoltage alarm also came up at this time just as it had during the manual initiation test on January 30, 1996.

   Repeated testing of the AOP breaker could not recreate the overload alarm. The AOP motor was meggered, the running currents were checked and the motor brushes were inspected. No abnormalities were found. The overload relay was tested and found to be set correctly and operating properly.

The 250V DC Battery Undervoltage alarm was investigated to determine if the cause of the alarm was related to the HPCI Motor Overload alarm. The undervoltage alarm was found to be set 3 volts high (253 volts) thereby annunciating at a higher voltage than intended. It was also determined that the alarm could be expected to occur during high battery loading conditions such as those found during a HPCI start-up. The undervoltage alarm was reset to trip at 250 volts. The design basis of the 250V DC battery was checked and the battery was found to be within its design. Therefore it was concluded that the cause of the undervoltage alarm was the same as the cause of the motor overload alarm on HPCI.

An analysis of the AOP start circuit concluded that a failure of the time delay bypass switches was the most likely component failure which could have caused both a motor overload condition and a higher than normal current draw on the 250V DC battery. These time delay switches bypass the resistors in the start circuit which limit the in-rush current to the AOP motor. The time delay switches were replaced.

The time delay switches will be disassembled to attempt to determine the cause of their failure.

3. Cycling of HPCI AOP during manual initiation test

Testing of the Unit 1 HPCI Oil system on January 31, 1996 showed that a combination of the pressure regulating valve (PRV #3) being out of adjustment (58 psig) and pressure switch (PS #4) being set to the low end of its setpoint tolerance (58 psig) caused the AOP to trip on high oil pressure to the HPCI control oil header. PRV #3 has a setpoint of 50 psig and PS #4 has a nominal setpoint of 60 psig plus or minus 2 psig. After AOP tripping, the oil pressure would drop below the reset point on PS #4 and allow the AOP to restart. Testing showed that this happened three times before the control header oil pressure would stay below the setpoint of PS #4 and allow the AOP to remain running. PS #4 is only in the AOP start circuit when there is an auto-initiation signal present.

PRV #3 had been reset in 1988. Additionally, during the investigation it was found that pressure gauge (PG #5) used to adjust PRV #3 was out of adjustment and read low by approximately 4 psig. It is possible that PG #5 was inaccurate at the time of PRV #3 adjustment in 1988 and that PRV #3 was adjusted high in part due to this gauge inaccuracy.

The root cause of this problem was inadequate preventive maintenance and/or trending of the HPCI oil system on the aforementioned regulating valves, pressure switches and instrumentation.

D. SAFETY ANALYSIS OF THE EVENT

The safety consequences of this event are minimal. During this event, the Feedwater [SJ], RCIC, Safe Shutdown Makeup, and Control Rod Drive Systems were available to provide a high pressure make-up water source to the reactor pressure vessel(RPV) if required. The Low Pressure Coolant Injection (LPCI) [BO] and Core Spray (CS) [BM] systems in conjunction with the Automatic Depressurization System (ADS) [RV] were operable during this event and would also have provided protection for the fuel in the event of a Loss of Coolant Accident.

E. CORRECTIVE ACTIONS

The following corrective actions were completed in response to the HPCI Gland Exhauster breaker trip:

- The Unit 1 HPCI Gland Exhauster breaker was replaced and tested for proper operation.
- The Unit 2 HPCI Gland Exhauster breaker was checked for proper operation.
- A HPCI Operability test was performed to verify integrated system response following all repairs associated with this event.

The following corrective actions were completed in response to the HPCI Motor Overload and 250 VDC Battery Undervoltage Alarm:

- The AOP time delay bypass switches in the starting circuit were replaced.
- The 250 VDC Undervoltage Alarm setpoint was reset to the proper value.

The following corrective actions were completed in response to the cycling of the AOP during the manual initiation test:

- PRV #3 was reset to the correct setpoint.
- PS #4 was recalibrated to the middle of its tolerance range (60 psig)
- Improvements to the HPCI Oil PM/trending program were initiated.
- The Unit 2 HPCI Oil system was reviewed for proper operation.

Additional corrective actions related to the HPCI Gland Exhauster breaker trip are:

- Evaluate PM on 250V DC breakers to include a routine trip check of the breaker. During the investigation it was found that routine trip checks are not performed. This action will be completed by 08/30/96. (NTS# 2541809600401. SSE).

- Disassemble HPCI Gland Exhauster breaker to attempt to determine the root cause of its failure. This action will be completed by 06/30/96. (NTS # 2541809600402. SED).

- Reevaluate replacement schedule for 250V DC breakers. This action will be completed by 06/30/96. (NTS# 2541809600403. SSE).

F. PREVIOUS EVENTS

During the investigation of this event, previous failure data was analyzed. It was determined that no previous events of the HPCI AOP cycling on and off during system start-up had occurred. There were also no previous documented failures of the time delay switches on DC breakers at Quad-Cities Station.

The Unit 1 HPCI Gland Steam Exhauster however had tripped one previous time in 1994 during HPCI system logic testing at the end refuel outage Q1R13. This event is documented in PIF #94-1858 on 7/28/94. The breaker contacts were adjusted after this event and the system was returned to service. There also were two other documented failures of 250V DC breakers on equipment not related to the HPCI system at Quad-Cities Station. One of these failures was attributed to excessive current and the other was attributed to age.

NPRDS data on this event yielded no failures of the time delay switches in DC breakers, and no failures of the pressure regulating valves in the HPCI oil system. It should be noted that only Dresden and Quad-Cities Stations have this type of HPCI Turbine with this type of oil system. NPRDS data did not contain any failures of Westinghouse DC breakers of this model other than the failures noted at Quad-Cities Station.

G. COMPONENT FAILURE DATA

1) Component Description: Pressure Regulating Valve
Manufacturer/Type: Cash Acme
Model Number: E-55

2) Component Description: Time Delay Switch
Manufacturer/Type: Cutler Hammer
Model Number: 10923H25B

3) Component Description: 250V DC Breaker
Manufacturer/Type: Westinghouse
Model Number: FA2080M