

Commonwealth Edison Company
Quad Cities Generating Station
22710 206th Avenue North
Cordova, IL 61242-9740
Tel 309-654-2241

LWP-95-101

ComEd

November 8, 1995

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

Reference: Quad Cities Nuclear Power Station
Docket Number 50-265, DPR-30, Unit Two

Enclosed is Licensee Event Report (LER) 95-008, 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)(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:

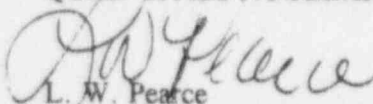
1. HPCI oscillation testing will be completed during U-2 start-up.
2. A program to control and document the instrument air pressure settings for selected Air Operated valves will be established.
3. Complete Unit Two HPCI Drain Pot inspection under NWR #950102144 task #02 prior to Unit Two startup.
4. Initiate an increased testing frequency on both Unit One and Unit Two HPCI systems in order to increase confidence in the system and determine if any other system components are near failure.

A Supplemental LER will be submitted when the final root cause(s) of the failure has been determined.

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: J. Schrage
C. Miller
INPO Records Center
NRC Region III

JE221

**Licensee Event Report
Reviewer Assignment Form**

Revised 12/01/94

LER # 2651809500800

Date: October 18, 1995

Subject: Unit Two HPCI Speed, Flow and Discharge Pressure Oscillations Inlet Drain
Pot High Level Alarm and Failure of the 2-2301-28 Valve.

Signatures of reviewers indicating review and approval of item:

Systems Eng. Supv:

GAMILLER 11-8-95
Date

Date

Operating Eng.:

M/KOOI 11/8/95
Date

Date

De/REG 11/8/95
Date

Date

Date

Date

Approved:

[Signature]
Station Manager/PORC Chairman

11/15/95
Date

g.a.m. 11/15/95

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev. 2.0

FACILITY NAME (1) Quad Cities Unit Two	DOCKET NUMBER (2) 0 5 0 0 0 2 6 5	LER NUMBER (6) <table border="1"> <tr> <td>Year 9 5</td> <td>Sequential Number - 0 0 8</td> <td>Revision Number - 0 0</td> </tr> </table>	Year 9 5	Sequential Number - 0 0 8	Revision Number - 0 0	PAGE (3) 2 OF 0 6
Year 9 5	Sequential Number - 0 0 8	Revision Number - 0 0				

TEXT Energy Industry Identification System (EIIIS) 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 Two HPCI Speed, Flow and Discharge Pressure Oscillations Inlet Drain Pot High Level Alarm and Failure of the 2-2301-28 Valve.

A. CONDITIONS PRIOR TO EVENT:

Unit: Two	Event Date: October 18, 1995	Event Time: 1642
Reactor Mode: 4	Mode Name: Run	Power Level: 87

This report was initiated by Licensee Event Report LER 265\95-008.

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:

At 1642 hours on 10/18/95, the monthly surveillance for the High Pressure Coolant Injection (HPCI) system was being performed. The reactor (Rx) was in the run mode at 87% of rated core thermal power. At 1655 the Unit Two (U-2) HPCI demonstrated unexplained speed, flow and discharge oscillations. At 1655 hours the U-2 HPCI was manually tripped from the control room and declared inoperable and QCOS 2300-2, "HPCI Outage Report" was completed. Event Notification to the NRC was transmitted at 1811. On 10/18/95 at 1655 PIF 95-2673 was generated and Action Requests on the AO-2-2301-28 (#180174) and HPCI (#180187) were written. A 14 day Limiting Condition of Operation (LCO), per Tech Spec section 3.5.C.3. was entered. A Probabilistic Risk Assessment (PRA) evaluation for Core Damage Frequency was completed, which indicated a Yellow condition at 16.27 times nominal.

An Engineering Root Cause Investigation Team was formed on 10/19/95. Three (3) Teams were established to address the three (3) issues:

HPCI Oscillations
HPCI AO-2-2301-28 failure
HPCI Drain Pot High Level Alarm

Investigations including troubleshooting were underway on 10/21/95 when at 2158 hours, U-2 was manually shutdown due to a SCRAM Discharge Volume (reference LER 1-95-007) design issue.

C. APPARENT CAUSE OF THE EVENT:

Although the exact failure mode(s) has not been determined, it is apparent the following information is relevant to the problems identified.

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HPCI OSCILLATIONS

The HPCI oscillations were a contributing factor in declaring the HPCI system inoperable. Prior to U-2 being shut down, a turbine line set was performed in which the travel of the various lever arm pistons in the turbine front standard were measured. The secondary operating cylinder on the turbine moved five (5) times greater than the specification recommended by the Vendor. This increased gain in the mechanical portion of the system may be a contributing reason for the instabilities that were observed. The decision was made to wait until the U-2 start-up to test this theory. It is planned to run HPCI at a pressure below 150 psig in order to adjust the speed control components in the front standard. When satisfactory pressure and flow performance has been obtained, reactor pressure will be increased to greater than 150 psig to perform the required operability testing. A Supplemental report will be issued when the root cause for these oscillations is identified.

HPCI AO-2-2301-28 VALVE FAILURE

The HPCI Steam Line to Drain Pot Drain Valve, 2-2301-28, failure was identified while using the Quad Cities Annunciator (QCAN) procedures. Approximately one (1) minute into the surveillance, the Drain Pot High Level alarm, 902-3-B-11, annunciated and the control room personnel entered the QCAN's to resolve this anomaly. The procedure calls for the manipulation of the AO-2-2301-29 and AO-2-2301-30 valves prior to manipulating the AO-2-2301-28 valve. When the procedure called for the operator to manipulate the AO-2-2301-28, the valve failed to respond. This failure calls for the operator to terminate the operation of HPCI.

PIF# 95-2687 and Action Request# 950058458 were generated on 10/20/95 to evaluate whether the Unit One (U-1) HPCI AO-1-2301-28 valve would consistently and reliably perform it's design function. An Issue Screening, performed on 10/21/95, verified that required design functions were met and no concerns existed.

As the investigation on U-2 progressed, it was determined that the 2-2301-28 valve was mechanically stuck in the closed position. Testing/stroking of the valve revealed that the plug hesitated and "jerked" coming off the seat. Upon disassembly it was discovered that the plug was being forced into the valve seat in a manner which deformed the seating surfaces causing a 'burr' to form. This deformation was causing the "jerking" motion. It is postulated that high instrument air pressure (96 psig) was applying excessive force on the plug, thereby forcing the plug into the seat. Recommended air pressure per the manufacturer valve data sheet is between 62 and 91.2 psig. The lack of control to ensure the pressure regulator was set within manufacturer recommendations caused the valve to fail.

Following this event Unit One and Unit Two HPCI air operated valve pressure regulators were inspected and found to be within the vendor recommended settings.

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HPCI DRAIN POT HIGH LEVEL ALARM

Troubleshooting/testing has indicated the AO-2-2301-31, HPCI Steam Supply Drain Line Trap Bypass valve, opens and closes with the actuation of the HPCI High Level Drain Pot Level switch per design. This testing was performed by draining the water that had collected in the pot while observing the control room alarm and 2-2301-31 valve movement. The Root Cause Team generated a test that provided confidence in the existing switch. One possible root cause of this event is that the existing switch binded slightly. This could have been caused by corrosion on the switches lever assembly. This corrosion could have come from a steam leak at the root of the Magnetrol. This leak was repaired by seal-welding the magnetrol to the drain pot during an earlier outage. The Electrical maintenance personnel evaluated the switch to be fully functional so no repairs or replacement was necessary. On 11/14/95, the Drain Pot level switch was tested under QCOS 2300-15 PFC# 1831, Drain Pot Level Switch Test, and found to be functioning properly. This test allowed the operator to fill and drain the drain pot four(4) times, each time verifying the proper functioning of the AO-2-2301-31 and the B-11 annunciator. All transitions performed as expected. This portion of the troubleshooting indicates that the level switch is working properly at this time. Another, second possible root cause, is that corrosion materials inside the drain pot caused binding between the magnetic pickup plug and the nonmagnetic tubing casing. Further investigation by looking inside the drain bowl with a boroscope might determine if the condition of the drainbowl itself, ie. rust, etc., might have contributed to the binding of the plug. This boroscope inspection is included in the scope of work within NWR# 950102144 task #02. This is a prior to startup work request. Unit One HPCI was run on 11/9/95 to verify operability of the system and it's components. No problems with the drainpot or the level switch were noted.

D. SAFETY ANALYSIS OF EVENT:

The safety significance of this event was minimal due to the availability of backup and support systems. Technical Specifications require that if the HPCI system is found to be inoperable, continued reactor operation is permissible for fourteen (14) days providing that backup systems are available.

Throughout this event, the backup systems, i.e. Reactor Core Isolation Cooling (RCIC) [BN], Automatic Depressurization System (ADS)[RV], Core Spray (CS) [BM], and Low Pressure Coolant Injection (LPCI) [BO] mode of Residual Heat Removal (RHR) system were available to provide adequate core cooling in the event of a design basis accident.

Unit One HPCI remained operable during this event.

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E. CORRECTIVE ACTIONS:

CORRECTIVE ACTIONS COMPLETED

- Repairs have been made to the 2-2301-28 valve and air pressure has been reestablished to within Vendor recommended settings. Unit One AO-1-2301-28 was evaluated as fully functional. Remaining HPCI Unit One and Unit Two air operated pressure regulators were inspected and found to be within the vendor recommended settings.
- The Magnetrol level switch was successfully tested and evaluated under QCOS 2300-15 PFC# 1831 to be fully functional.
- Ran Unit One HPCI on 11/9/95 to verify system and component operability and availability. No problems with the drainpot or level switch were noted.

CORRECTIVE ACTIONS TO BE COMPLETED

- HPCI oscillation testing will be completed during U-2 start-up. (NTS # 2651809500801, SED, 12/13/95, Hutchinson, Swales)
- A program to control and document the instrument air pressure settings for selected Air Operated valves will be established. (NTS # 2651809500802, SES, 12/31/96, Hutchinson, Arnold)
- Complete Unit Two HPCI Drain Pot inspection under NWR #950102144 task #02 prior to Unit Two startup. (NTS # 2651809500803, SED, 12/13/95, Hutchinson, Swales)
- Initiate an increased testing frequency on both Unit One and Unit Two HPCI systems in order to increase confidence in the system and determine if any other system components are near failure. (NTS # 2651809500804, OPS, 12/13/95, Cook, Cook)

A Supplemental LER will be submitted when the final root cause(s) of the failure has been determined.

F. PREVIOUS EVENTS:

- LER 1-94-007, HPCI 1-2301-63B Restricting Orifice Found 95% Plugged With Slag Due to an Unknown Cause
- LER 1-94-008, HPCI Flow Oscillation During Operability Run Due to Broken Instrumentation Wire

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G. COMPONENT FAILURE DATA:

1. Data for HPCI Oscillations will be provided in a supplemental report when the root cause(s) is (are) identified.
2. Component Description: Air Operated Valve
Manufacturer / Type: Copes Vulcan Company/Drain Pot Vent to Condenser
Serial Number: 6710-58363-17
Part Number: 139740K (plug), 129309MKD (stem)
3. Data for the HPCI Drain Pot Level Switch event will be provided in a supplemental report when the root cause(s) is (are) identified.