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 6

Title (4)

High Pressure Coolant Injection Steam Line High Flow Trip Setpoint Outside Specification Due to Inadequate Testing

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)
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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)	50.73(a)(2)(v)	73.71(c)
0 9 5		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)	X 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
K. J. Hill, Technical Staff Engineer, Ext. 2150	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
X Yes (If yes, complete EXPECTED SUBMISSION DATE)	NO				

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

ABSTRACT

On August 22, 1988, preliminary results of Special Test 1-112, High Pressure Coolant Injection (HPCI) Steam Line High Flow Setpoint Check, showed that the Unit One HPCI High Steam Line Flow Trip setpoint was too high. After meeting with station management and having General Electric verify the calculations, it was determined that Unit One was operable but out of Technical Specification limits, and Unit Two should be tested.

Special Test 2-85 on August 23, 1988, used a different method and showed Unit Two HPCI to have a low and thus acceptable setpoint. Unit One was retested, and the results of the original test verified (Special Test 1-113). On August 24, 1988, the Unit One HPCI High Steam Line Flow Trip setpoint was lowered, and HPCI operability was run successfully. Inadequate pre-service testing was the cause of this event. Unit 2 HPCI High Steam Line Flow Trip setpoint was tested, but then these results were assumed to apply to Unit One HPCI. Apparently, there is some difference in the piping inside the drywell that makes this assumption invalid.

The drywell HPCI piping on both units will be walked down at the next outage. RCIC will be checked for the same problem.

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PLANT AND SYSTEM IDENTIFICATION:

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

EVENT IDENTIFICATION: Unit One High Pressure Coolant Injection steam line high flow trip setpoint outside Technical Specifications due to inadequate testing.

A. CONDITIONS PRIOR TO EVENT:

Unit:	One	Event Date:	August 24, 1988	Event Time:	1400
Reactor Mode:	4	Mode Name:	RUN	Power Level:	95%

This report was initiated by Deviation Report D-4-1-88-059.

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:

At 1400 hours on August 24, 1988, Unit One was in the RUN mode at approximately 95 percent reactor [RCT] thermal power.

Prior to this event, at 1355 hours on August 22, 1988, Special Test 1-112, High Pressure Coolant Injection (HPCI) [BJ] Steam Line High Flow [JM] Setpoint Check, was completed on the Unit One HPCI system. The purpose of this test was to determine the value for differential pressure in the HPCI steam supply line which corresponds to 300 percent of rated steam flow. Per Technical Specifications Table 3.2-1, the HPCI system is required to isolate when steam flow is greater than 300 percent of rated steam flow.

Differential pressure is measured across an elbow installed in the steam supply line. The differential pressure is monitored by an analog trip system consisting of two locally mounted differential pressure transmitters [PDT] and four remotely located trip switches [IS] (two per transmitter). Two of the switches trip on a negative differential pressure of -190 inches of water and two of the switches trip on a positive differential pressure of +210 inches of water. A trip of a positive switch would indicate a steam line break and a trip of a negative switch would indicate a break in the instrument sensing line.

The special test initiated with a request from Commonwealth Edison's BWR Engineering Department. Similar testing had been performed recently at Dresden Nuclear Power Station which raised concerns about the accuracy of the current trip setpoint. On March 18, 1973, a test similar to Special Test 1-112 was performed on Quad Cities Unit Two HPCI. In this earlier test, 300 percent of rated steam flow was calculated to correspond to 544 inches of water. The results of this test were used to select the instrument trip setpoint of both units. Quad Cities Station provided the test results from 1973 to BWR Engineering, but also decided to perform the test in order to verify the original test results.

In Special Test 1-112, the HPCI turbine was placed in operation and test conditions were established. The voltage potential of the signal input to the trip switches was then measured and converted to a differential pressure (1 to 5 volts equals -300 to +300 inches of water). Using the differential pressure at test conditions, a value for differential pressure corresponding to 300 percent of rated flow was calculated using a formula supplied by General Electric (GE).

Preliminary results of Special Test 1-112 indicated that the value corresponding to 300 percent of rated steam flow on Unit One HPCI was 164 inches of water, which was less than the current trip setpoint. The test results were discussed with station management and it was decided to forward the results to General Electric personnel for verification of the calculation. The test results were sent to GE via BWR Engineering. Further corrective action would be taken pending verification of the results by GE personnel.

At approximately 1300 hours on August 23, 1988, station personnel were notified by BWR Engineering personnel that GE had reviewed the results of Special Test 1-112 and had determined the calculation to be correct. A discussion was then held involving station management and members of BWR Engineering. The reason for the difference between the results of Special Test 1-112 and the previous test performed in 1973 could not be explained. It was also felt that the method for measuring the differential pressure in Special Test 1-112 did not eliminate the possibility of equipment error or false readings. Since the results of the special test potentially affected both Unit One and Two, it was decided to perform the same test on Unit Two HPCI prior to making any setpoint changes. However, the Unit One HPCI system could be considered fully operable because the steam line high flow instrumentation was still capable of isolating HPCI in the event of a steam line break. Recent calculations performed by NUTECH indicated that the differential pressure developed in the event of a HPCI steam line break is well in excess of the differential pressure corresponding to 300 percent of rated steam flow. The issue was discussed with members of the Nuclear Licensing Department, and it was determined that the condition was not immediately reportable pending the results of further tests.

At 2000 hours on August 23, 1988, Special Test 2-85, HPCI Steam Line High Flow Setpoint Check, was completed on the Unit Two HPCI system. This test was similar to the previous test performed on Unit One HPCI, but differed in the method used to measure the differential pressure. In this test, the current output of the transmitter was measured by connecting an ammeter to test connections at the transmitter. The current measured was then converted to a differential pressure using previous calibration data for the transmitter.

This method would provide more accurate results than the previous method and eliminate the possibility of equipment error or false readings.

The results of Special Test 2-85 indicated that the value corresponding to 300 percent of rated steam flow on Unit Two HPCI was 1121 inches of water, which was much greater than the current trip setpoint.

The reason for the difference between the results of Special Test 2-85 and the test performed in 1973 is due to the fact that the original calculations did not correct for difference in test conditions and rated conditions whereas the GE calculation did. The actual differential pressure measured under test conditions was similar in both Special Test 2-85 and the test in 1973.

On August 24, 1988, the results of Special Test 2-85 and 1-112 were discussed by station management and BWR Engineering. Since a major discrepancy existed between the results obtained on Unit One and the results obtained on Unit Two, it was decided to repeat the test on Unit One using the same method used on Unit Two.

At 1400 hours on August 24, 1988, Special Test 1-113, HPCI Steam Line High Flow Setpoint Check, was completed on the Unit One HPCI system. The results of this test indicated that the value corresponding to 300 percent of rated steam flow on Unit One HPCI was 172 inches of water, which was less than the current trip setpoint. This test agreed with the original test results obtained on Unit One.

After further discussion, it was decided to perform an instrument setpoint change of the Unit One HPCI Steam Line High Flow Differential Pressure Switches to bring the system within the requirements of Technical Specifications. The new setpoint would be +150 and -150 inches of water. Change number 347 was processed in accordance with procedure QAP 400-4, Instrument Setpoint Change

At 1730 hours on August 24, 1988, Instrument Maintenance personnel implemented the setpoint change and completed QIS 16-1, HPCI Steam Line High Flow Analog Trip System Calibration. At 2130 hours on August 24, 1988, Operating personnel successfully completed QOS 2300-1, HPCI Monthly and Quarterly Test, to verify HPCI operable following the setpoint change.

C. APPARENT CAUSE OF EVENT:

This event is being reported according to 10CFR50.73(a)(2)(i)(B): the licensee shall report any operation or condition prohibited by the plant's Technical Specifications.

The cause of the Unit One instrument setpoint exceeding the Technical Specification requirement is due to an inadequate initial setpoint verification. The differential pressure measured at the elbow in the 1973 test was approximately the same as the results of the Unit Two test in this event. However, no test was performed on Unit One HPCI prior to the one described in this report. The results of the initial test on Unit Two were used to determine an instrument setpoint for the HPCI Steam Line High Flow Differential Pressure Switches.

The reason for the difference in differential pressure experienced in Unit Two and Unit One HPCI has not been determined. The elbow to which the differential pressure sensing lines are connected is located inside primary containment and is connected to transmitters located directly outside primary containment. The piping of the sensing lines exterior to containment is the same on both Unit One and Unit Two. It is suspected that there is some difference in the installation of the pressure taps on the elbow or the location of the elbow itself which could account for the difference. The containment of either unit has not been accessible since this event (i.e., no outages).

D. SAFETY ANALYSIS OF EVENT:

The safety of the plant and personnel was not affected during this event. The HPCI system is designed to auto-initiate and supply make-up water to the reactor vessel upon receipt of a low-low reactor water level signal (-59 inches) [JE] or a high drywell pressure signal (+2.5 psig). The HPCI system is designed to auto-isolate upon receipt of a low reactor pressure signal (100 psig), a steam line high flow signal (300 percent flow for more than three seconds), or an area high temperature signal (200 degrees Fahrenheit).

The Unit One HPCI Steam Line High Flow isolation was considered to be fully operable throughout this event. Elbow tap flow measurement techniques are well suited for applications where gross changes in flow are being detected. In the event of an actual steam line break, the differential pressure developed at the elbow would be in excess of the previous trip setpoint. However, it is common industry practice to select a trip setpoint at a value corresponding to less than 300 percent of rated steam flow. This is also used as the basis for the Technical Specification requirement.

E. CORRECTIVE ACTIONS:

The immediate corrective actions consisted of performing an instrument setpoint change to bring the system within the requirements of Technical Specifications. At the first available outage, the piping of the HPCI steam line and flow sensing lines will be walked down in order to determine any difference between the two units (NTS 2542008805901).

The Reactor Core Isolation Cooling System (RCIC) [BN] system steam line high flow isolation instrumentation is similar to that on HPCI, and the Technical Specification requirements are the same. A test of the RCIC system was performed in 1973 as was performed on HPCI. The calculation for RCIC had also not corrected for the difference between test conditions and rated conditions and was, therefore, conservative with respect to the actual differential pressure corresponding to 300 percent of rated steam flow. However, recent observations under test conditions on both RCIC units has found no significant difference in differential pressure and no significant change from the original test differential pressure. Therefore, the setpoint of the RCIC steam line high flow trip is within the requirements of Technical Specifications.

A Special Test will be performed to verify the RCIC setpoints (NTS 2542008805902).

F. PREVIOUS EVENTS:

This is the first report of a system being in violation of Technical Specifications due to inadequate initial startup testing.

G. COMPONENT FAILURE DATA:

There was no component failure associated with this event.

Commonwealth Edison
Quad Cities Nuclear Power Station
22710 206 Avenue North
Cordova, Illinois 61242
Telephone 309/654-2241

RLB-88-314

September 19, 1988

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) 88-014, 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): the licensee shall report any operation or condition prohibited by the plant's Technical Specifications.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

R A Robey for
R. L. Bax
Station Manager

RLB/AF/ad

Enclosure

cc: I. Johnson
R. Higgins
INPO Records Center
NRC Region III

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