



Commonwealth Edison  
Quad-Cities Nuclear Power Station  
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Telephone 309/654-2241

IE FILE COPY

NJK-76-424

November 15, 1976



J. Keppler, Regional Director  
Office of Inspection and Enforcement  
Region III  
U. S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

Reference: Quad-Cities Nuclear Power Station  
Docket No. 50-265, DPR-30, Unit 2  
Appendix A, Sections 3.5.D.3 and 6.6.B.1.e

Enclosed please find Reportable Occurrence Report No. RO 50-265/76-16 for Quad-Cities Nuclear Power Station. This occurrence was previously reported to Region III, Office of Inspection and Enforcement by telephone on November 1, 1976 and by telecopy on November 2, 1976.

This report is submitted to you in accordance with the requirements of Technical Specification 6.6.B.1.

Very truly yours,

COMMONWEALTH EDISON COMPANY  
QUAD-CITIES NUCLEAR POWER STATION

N. J. Kalivianakis  
Station Superintendent

NJK/WRM/1k

cc: G. A. Abrell

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PDR ADOCK 05000265  
S PDR

NOV 18 1976

# LICENSEE EVENT REPORT

CONTROL BLOCK: 1         6

(PLEASE PRINT ALL REQUIRED INFORMATION)

LICENSEE NAME	LICENSE NUMBER	LICENSE TYPE	EVENT TYPE
<span style="border: 1px solid black; padding: 2px;">01</span> <span style="border: 1px solid black; padding: 2px;">I</span> <span style="border: 1px solid black; padding: 2px;">L</span> <span style="border: 1px solid black; padding: 2px;">Q</span> <span style="border: 1px solid black; padding: 2px;">A</span> <span style="border: 1px solid black; padding: 2px;">D</span> <span style="border: 1px solid black; padding: 2px;">2</span>	<span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">-</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">-</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span>	<span style="border: 1px solid black; padding: 2px;">4</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">1</span>	<span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">1</span>
7 8 9 14	15 25	26 30	31 32

CATEGORY	REPORT TYPE	REPORT SOURCE	DOCKET NUMBER	EVENT DATE	REPORT DATE
<span style="border: 1px solid black; padding: 2px;">01</span> CONT	<span style="border: 1px solid black; padding: 2px;">T</span>	<span style="border: 1px solid black; padding: 2px;">L</span>	<span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">5</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">-</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">6</span> <span style="border: 1px solid black; padding: 2px;">5</span>	<span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">6</span>	<span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">5</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">6</span>
7 8 57 58	59 60	61 68	69 74	75 80	

## EVENT DESCRIPTION

<span style="border: 1px solid black; padding: 2px;">02</span>	On October 31, 1976, Unit Two was in the RUN mode commencing start-up following a	80
<span style="border: 1px solid black; padding: 2px;">03</span>	refueling outage. In accordance with Technical Specification 4.5.D.1.B, manual	80
<span style="border: 1px solid black; padding: 2px;">04</span>	operation of the main steam Electromatic Relief Valves was to be performed. Valves	80
<span style="border: 1px solid black; padding: 2px;">05</span>	2-2-3-3C and 2-203-3E failed to open when actuated from the control room. Valves	80
<span style="border: 1px solid black; padding: 2px;">06</span>	2-203-3A, 2-203-3B, and 2-203-3E were found to open satisfactorily. Opening of the	80

SYSTEM CODE	CAUSE CODE	COMPONENT CODE	PRIME COMPONENT SUPPLIER	COMPONENT MANUFACTURER	VIOLATION
<span style="border: 1px solid black; padding: 2px;">07</span> <span style="border: 1px solid black; padding: 2px;">S</span> <span style="border: 1px solid black; padding: 2px;">F</span>	<span style="border: 1px solid black; padding: 2px;">E</span>	<span style="border: 1px solid black; padding: 2px;">V</span> <span style="border: 1px solid black; padding: 2px;">A</span> <span style="border: 1px solid black; padding: 2px;">L</span> <span style="border: 1px solid black; padding: 2px;">V</span> <span style="border: 1px solid black; padding: 2px;">E</span> <span style="border: 1px solid black; padding: 2px;">X</span>	<span style="border: 1px solid black; padding: 2px;">N</span>	<span style="border: 1px solid black; padding: 2px;">D</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">4</span> <span style="border: 1px solid black; padding: 2px;">3</span>	<span style="border: 1px solid black; padding: 2px;">N</span>
7 8 9 10	11	12 17	43	44 47	48

## CAUSE DESCRIPTION

<span style="border: 1px solid black; padding: 2px;">08</span>	The apparent cause of this occurrence is equipment failure of the electromatic	80
<span style="border: 1px solid black; padding: 2px;">09</span>	relief valve. These valves are activated by a pilot valve. When the pilot opens,	80
<span style="border: 1px solid black; padding: 2px;">10</span>	steam passes through an orifice in the disc retaining plate, through the pilot (contd)	80

FACILITY STATUS	% POWER	OTHER STATUS	METHOD OF DISCOVERY	DISCOVERY DESCRIPTION
<span style="border: 1px solid black; padding: 2px;">11</span> <span style="border: 1px solid black; padding: 2px;">E</span>	<span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">0</span>	<span style="border: 1px solid black; padding: 2px;">NA</span>	<span style="border: 1px solid black; padding: 2px;">B</span>	Surveillance Testing
7 8 9	10 12 13	44	45	46 80

FORM OF ACTIVITY RELEASED	CONTENT OF RELEASE	AMOUNT OF ACTIVITY	LOCATION OF RELEASE
<span style="border: 1px solid black; padding: 2px;">12</span> <span style="border: 1px solid black; padding: 2px;">Z</span>	<span style="border: 1px solid black; padding: 2px;">Z</span>	<span style="border: 1px solid black; padding: 2px;">NA</span>	<span style="border: 1px solid black; padding: 2px;">NA</span>
7 8 9	10 11	44	45 80

## PERSONNEL EXPOSURES

NUMBER	TYPE	DESCRIPTION
<span style="border: 1px solid black; padding: 2px;">13</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span>	<span style="border: 1px solid black; padding: 2px;">Z</span>	<span style="border: 1px solid black; padding: 2px;">NA</span>
7 8 9 11	12	13 80

## PERSONNEL INJURIES

NUMBER	DESCRIPTION
<span style="border: 1px solid black; padding: 2px;">14</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span>	<span style="border: 1px solid black; padding: 2px;">NA</span>
7 8 9 11	12 80

## OFFSITE CONSEQUENCES

<span style="border: 1px solid black; padding: 2px;">15</span>	NA	80
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## LOSS OR DAMAGE TO FACILITY

TYPE	DESCRIPTION
<span style="border: 1px solid black; padding: 2px;">16</span> <span style="border: 1px solid black; padding: 2px;">Z</span>	<span style="border: 1px solid black; padding: 2px;">NA</span>
7 8 9 10	80

## PUBLICITY

<span style="border: 1px solid black; padding: 2px;">17</span>	NA	80
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## ADDITIONAL FACTORS

<span style="border: 1px solid black; padding: 2px;">18</span>	(Event Description contd) valves was verified by main turbine bypass valve	80
<span style="border: 1px solid black; padding: 2px;">19</span>	closure response. Valves 2-203-3C and 2-203-3E failed to show a response and a (contd)	80

NAME: John Pearson PHONE: 309-654-2241 Ext. 252

#### CAUSE DESCRIPTION continued

valve, and into the discharge line leading to the pressure suppression chamber. This causes a differential pressure across the valve disc which results in the valve being forced open by reactor steam pressure. The valve disc operating seal is accomplished by a set of piston rings seating against a valve disc guide. Upon inspection both 2-203-3C and 2-203-3E were found to have apparent valve disc guide corrosion leading both to possible piston ring binding or leakage. Also, in later inspection of valve 2-203-3E the threaded connection sealing the disc retaining plate was found loose due to thread damage, allowing steam to leak around the plate and bypass the orifice. This increased the pressure under the valve disc and thereby reduced pressure difference on the disc. This resulted in insufficient force to activate the relief valve.

#### EVENT DESCRIPTION continued

pilot valve problem was suspected. In accordance with Technical Specification 3.5.D.3, an orderly shutdown was made to initiate repairs. After inspection and adjustment of the pilot assemblies, they were returned to service and functionally tested three times on November 1, 1976. A reactor startup began and the mode switch was placed into the RUN position at 11:05AM. At 11:30 AM, with the reactor at operating pressure, an attempt was made to operate the C and E electromatic relief valves individually, with a main turbine bypass valve open. A temperature rise was observed signifying pilot valve actuation, but an accompanying turbine bypass valve closure response was not observed, thus indicating an absence of steam flow through the relief valves. Immediately control rods were inserted for an orderly shutdown of the unit. Work Request 4077-76 and 4078-76 were written to determine the cause of the failures and perform repairs.

The Main Steam Relief Valves serve to protect the reactor pressure vessel against over-pressurization under ordinary and accident conditions. At all times during this occurrence the three remaining electromatic relief valves and all nine safety valves were fully functional, providing adequate pressure relief capacity. In addition, since steam flow was less than 45 percent of rated, this steam flow could have been routed to the condenser via the main turbine bypass valves, all nine of which were functional. Therefore, overpressure protection for the reactor vessel was adequate, and the safety limit of 1325 psig reactor vessel steam space pressure was in no danger of being exceeded as a result of this occurrence. At all times during this occurrence the High Pressure Coolant Injection (HPCI) subsystem was fully operable. Since adequate high pressure core cooling was available, the reactor safety implications of this occurrence were minimized, and at no time was the ability to safely shutdown the reactor compromised. Therefore, plant safety and the health and safety of the public were unaffected by this occurrence.  
( R0-50-265/76-16)

#### Corrective Action to Prevent Recurrence

Valves 2-203-3C and 2-203-3E were removed, disassembled, and rebuilt. Each valve received a new valve disc guide and new piston rings. Additionally,

the "E" valve received a new pilot valve disc. Both valves were shop tested for leakage and reinstalled in the drywell. A unit startup was made on November 2, 1976. At 400 psig reactor pressure and one bypass valve open, valve 2-203-3C was activated three times successfully from the control room. Each time, a bypass valve closure response was obtained. However, valve 2-203-3E would not open. Unit Two was shutdown early on November 3, 1976. The 3E valve was removed and disassembled.

Valve disc retaining plate thread damage was discovered. The valve was then replaced by a spare valve that had been previously rebuilt. The disc seat was lapped and the valve was shop tested for leakage and operability. After reinstalling 2-203-3E, it was returned to service on November 4, 1976. The unit was started up shortly thereafter and reactor pressure increased to 400 psig. With one bypass valve open, the 2-203-3E valve was tested to satisfactorily open three times.

Present planning calls for the two remaining electromatic relief valves on each unit to be inspected and overhauled as necessary during their next refueling outages. Another result of this occurrence is the inadequacy of the relief valve manual activation test procedure. To remedy this situation, the procedure was modified to employ main turbine bypass valve closure as an indicator of relief valve steam flow, in conjunction with temperature rise.

#### Failure Data

The relief valves in question are both Dresser Industrial Valves and Instrument Division electromatic relief valves, serial numbers BK 7070 and BK 7072. No prior cases of valve activation failure have occurred at Quad Cities Station. However, a related event took place in April, 1973 whereby disassembly of valve 2-203-3E revealed the locking mechanism for the disc retainer plate to be missing. At that time the retainer itself was found tight and the valve declared fully operable. Locking screws were installed to prevent the loosening of the retainers.