



Commonwealth Edison

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LWP-95-005

January 31, 1995

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) 95-001, Revision 00, for Quad Cities Nuclear Power Station.

This report is submitted as a voluntary report only.

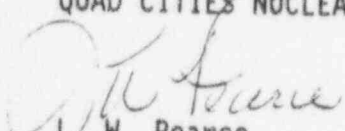
There are two additional commitments being made by this letter:

1. The Unit-2 RCIC governor valve (2-1303A) will be disassembled, inspected, and repaired as necessary during the next unit refuel outage (Q2R13). The inspection will focus on possible valve stem degradation, and will inspect sub components for suitable materials.
2. A supplemental report will be issued after testing is completed to determine the exact cause of the governor valve stem corrosion.

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/TB/sa

Enclosure

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

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LICENSEE EVENT REPORT (LER)

Form Rev. 2.0

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| Facility Name (1) Quad Cities Unit One | | | | | | | | | | Docket Number (2) 0 5 0 0 0 2 5 4 | | | | | | | | | | Page (3) 1 of 0 6 | | | | | | | | | | | | |
| Title (4) During Unit Startup The RCIC Governor Valve Failed To Meet Expected Capabilities Due To Valve Stem Corrosion | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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) 3 | | | | | | | | | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11) | | | | | | | | | | | | | | | | | | | | | | | |
| POWER LEVEL (10) 0 0 0 | | | | | | | | | 20.402(b) | | | | | | 20.405(c) | | | | | | 50.73(a)(2)(iv) | | | | | | 73.71(b) | | | | | |
| | | | | | | | | | 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) | | | | | | X 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 Dan Brigl, System Engineering Department, Ext. 3115 | | | | | | | | | | | | | | | | | | | | | | | | TELEPHONE NUMBER | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | AREA CODE 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 | | | | | | | | | | | | | | |
| X | | B N | | F C V | | D 2 4 5 | | Y | | | | | | | | | | | | | | | | | | | | | | | | |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X YES (If yes, complete EXPECTED SUBMISSION DATE) | | | | | | | | | | | | | | | NO | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Expected Submission Date (15) | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Month Day Year | | | | | | | | | | | | | | | | | |
| ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

ABSTRACT:

At approximately 1400 hours on 01/2/95, Unit-1 startup was in progress with the mode switch in startup/hot standby. During Reactor Core Isolation Cooling (RCIC) Periodic Pump Operability Test, the governor valve would not respond to the signals coming from the system Flow Controller. The governor valve was in the full open position and remained in that position.

At 0230 hours on 1/3/95 a manual Reactor Scram was initiated per procedure and an ENS phone call made at 0244 hours.

The cause of the event was attributed to corrosion on the governor valve stem. The exact cause of the corrosion could not be determined. Corrective actions to be completed will be disassembly and inspection of the Unit-2 RCIC governor valve and issuance of a supplemental report after testing is completed to determine the exact cause of corrosion.

Corrective actions completed involved trouble shooting activities, disassembly and repair of the RCIC governor valve on Unit-1, procedure changes to the system vacuum pump running time, adjustment of vacuum pump settings, and operability testing of the Unit-2 RCIC system.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev. 2.0

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|---|--|----------------|---|-------------------|---|-----------------|----------------|----------|--|
| FACILITY NAME (1) Quad Cities Unit One | DOCKET NUMBER (2) 0 5 0 0 0 2 5 4 | LER NUMBER (6) | | | | | | PAGE (3) | |
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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: During Unit startup the RCIC Governor valve failed to meet expected capabilities due to valve stem corrosion.

A. CONDITIONS PRIOR TO EVENT:

Unit: One Event Date: January 2, 1995 Event Time: 2124
Reactor Mode: 03 Mode Name: Startup Power Level: 0

This report was initiated by Licensee Event Report Ler 254\95-001.

STARTUP (3) - In this position, the reactor protection scram trips, initiated by condenser low vacuum and main steamline isolation valve closure are bypassed, the low pressure main steamline isolation valve closure trip is bypassed and the reactor protection system is energized, with IRM and APRM neutron monitoring system trips and control rod withdrawal interlocks in service.

B. DESCRIPTION OF EVENTS:

On 01/2/95, Unit-1 startup was in progress with the mode switch in startup/hot standby. The unit had entered Tech Specs 4.5.E at 1142 hours which specifies a 12 hour period to complete low pressure RCIC testing following maintenance.

At approximately 1400 hours on 01/2/95, reactor pressure was at 253 psig.

During performance of "Reactor Core Isolation Cooling (RCIC) Periodic Pump Operability Test" (QCOS 1300-1) [BN] the system governor valve (1-1303A) [FCV] would not respond to the signals coming from the Flow Controller. The governor valve was in the full open position and remained in that position.

At 2124 hours RCIC was declared inoperable and Tech Spec 3.5.E.4 was entered. This Tech Spec requires that a shutdown be initiated and that Reactor pressure be reduced to less than 150 psig within 24 hours.

At 0230 hours on 1/3/95 a manual Reactor Scram was initiated and applicable procedures were entered. An ENS phone call was made at 0244 hours.

The Unit-2 RCIC was operability tested at 1230 hours on 1/3/95 with successful results.

| LICENSEE EVENT REPORT (LER) TEXT CONTINUATION | | | | | | | | | | | | | Form Rev. 2.0 | | | | | | | | | | |
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After governor valve disassembly under Nuclear Work Request (NWR) #Q19538, the RCIC System Engineer inspected the valve stem and associated parts on 1/4/95. The stem was observed to have corrosion and pitting.

At 0700 hours on 1/5/95 the Nuclear Work Request (NWR) #Q19538 work package was closed after reassembly of the governor valve.

At 0800 hours on 1/5/95 the Unit-1 RCIC system was ready to be put back into service for testing. The system was successfully tested on 1/10/95 during unit startup activities.

C. CAUSE OF THE EVENT:

This event is being reported as a voluntary LER.

1. The primary cause of the RCIC governor valve failing was corrosion on the valve stem.

The corrosion caused pitting on the governor valve stem surface area. The corrosion and pitting caused the valve to bind in the open position during surveillance testing on 01/2/95.

2. The exact cause of corrosion has not been determined. Possible causes of the governor valve stem corrosion could be due to materials incompatibility between the valve stem, stem washers, and the stem carbon spacers. A supplemental report will be issued for this LER after further testing is completed to determine the cause of valve stem corrosion.

The governor valve stem was made of 400 series stainless steel (SS), and the stem washers found on the repaired valve were made of a mixture of 400 and 300 series SS flat washers. The last known maintenance to the governor valve that could have introduced the mixture of stem washers was on 4/8/94.

Additionally, the material incompatibility between the valve stem carbon spacers (high sulfur content) and the stem washers could have created a subsequent acidic solution in the presence of moisture in the standby mode.

Recent changes in the RCIC gland seal vacuum pressure system could have contributed to the governor valve stem corrosion. Further testing with respect to this issue will be included in the supplemental report.

| LICENSEE EVENT REPORT (LER) TEXT CONTINUATION | | | | | | | | | | | | | | Form Rev. 2.0 | |
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D. SAFETY ANALYSIS:

The safety significance of this event was minimal. The effects the failure of the 1-1303A had on the RCIC safety functions are described below.

During startup and at low pressure conditions, the 1-1303A governor valve would remain in the full open position. Therefore, steam would still be allowed to enter the turbine. At the Reactor Pressure of 253 pounds, when the test was run, turbine speed reached 3500 rpm which was clearly well below the overspeed trip at 5600 rpm. Due to the governor valve not responding to the system flow controller inputs, the control room declared the RCIC system inoperable. However, at the reactor pressure during this event the RCIC system remained available to perform its design basis in accordance with Tech Spec limits.

E. CORRECTIVE ACTIONS:

The immediate actions completed for this event are as follows;

1. A root cause investigation team was assembled at 0700 on 1/3/95. A plan of action was established by the investigation team, and trouble shooting was started.
2. At approximately 1500 hours on 1/3/95, data from performing calibration of the RCIC Electronic to Governor Mechanical (E-GM) Control Box indicated that it was functioning in accordance with design specs.
3. A Procedure Field Change (PFC) was written to stroke the 1-1301-61 Turbine Steam Supply valve in order to verify the interlock contact switch was functioning properly.
4. Due to past experience, the RCIC System Engineer contacted Riverbend, Arkansas Nuclear, LaSalle and INPO to let them know that Quad Cities had experienced a similar event that these stations shared. After lengthy discussions, the common denominator of these industry events was valve binding attributed to corrosion and pitting of the valve stem.
5. The RCIC governor valve was disassembled and inspected to determine the cause of binding.
6. A Site Engineering Service Request (SESR) was initiated to provide guidance for the repair of the RCIC governor valve. Site Engineering and Construction (SEC) concurred with the conclusion of corrosion, and supported that the gland seal vacuum be increased to 12-15 inches (back to original setting).

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

Form Rev. 2.0

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TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]

7. The governor valve stem was sent to ComEd's System Material Analysis Department (SMAD) for further analysis of the valve failure.
8. The RCIC governor valve was repaired with more compatible materials (400 series stem and washers), low sulphur content carbon spacers, and increased gland seal vacuum (back to the original setting of 12-15 inches). The vendor approved the valve part changes. General Electric has been notified, and does not expect this vacuum setting to adversely affect RCIC system availability.
9. The Materials Management Department adjusted the Stores Item (SI) numbers and parts descriptions for the governor valve washers and carbon spacers. This action will ensure that correct series material of washers and sulphur content of the spacers are indicated during future procurement of valve parts.
10. Changes were made to RCIC testing procedures to increase the time the gland seal vacuum pump runs from 15 minutes to 30 minutes. This action will help to reduce moisture.
11. OPEX #7022 was sent out on 1/5/95 to document this event to the industry.

The RCIC system is tested for operability monthly (QCOS 1300-1) and quarterly (QCOS 1300-5). The station has a high confidence that the Unit-2 governor valve will remain operable until it can be disassembled and inspected during the next refuel outage.

Corrective actions to be completed are as follows:

1. The Unit-2 RCIC governor valve (2-1303A) will be disassembled, inspected and repaired as necessary during the next unit refuel outage (Q2R13). The inspection will focus on possible valve stem degradation and will inspect subcomponents for suitable materials. (NTS #25418095001002).
2. A supplemental report will be issued after testing is completed to determine the exact cause of the governor valve stem corrosion. (NTS #25418095001001)

| LICENSEE EVENT REPORT (LER) TEXT CONTINUATION | | | | | | | | | | | | | | Form Rev. 2.0 | |
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F. PREVIOUS OCCURRENCE:

A review of the Nuclear Plant Reliability Data System (NPRDS) indicted that 2 plants in the industry (LaSalle and Hatch) have experienced RCIC valve stem binding. Greater review indicated a common failure mode of valve stem binding attributed to corrosion, and pitting sometimes in the presence of excessive moisture.

Operating Experiences were reviewed, indicating that Riverbend 1 experienced an RCIC turbine trip due to corrosion on the governor valve stem.

Quad Cities LER database as far back as 1988 were reviewed. Nothing was found relevant to this event.

G. COMPONENT FAILURE DATA:

RCIC Governing Valve, HO-1303A, was manufactured by Terry Steam Turbine Co., Hartford, Conn. Dresser-Rand Co., Welsville, New York has purchased the Terry Steam Turbine Co.

Licensee Event Report Reviewer Assignment Form

Revised 12/01/94

LER # 254\95-001

Date: January 2, 1995

Subject: During Unit-1 Startup RCIC Governor Valve failed to meet expected
capabilities due to valve stem corrosion.

Signatures of reviewers indicating review and approval of item:

Systems Eng. Supv:

W. R. G. 1 1/24/95
Date

Don Bingham 1-24-95
Date

Operating Eng.:

S. J. Halcom 1-30-95
Date

Matthew Perry 1-31-95
Date

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Date

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Date

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Date

 /
Date

Approved:

 1-21-95
Station Manager/PORC Chairman Date