LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
QUAD-CITIES NUCLEAR POWER STATION, UNIT TWO	0 5 0 0 0 2 6 5	1 of 0 6

Title (4) Suppression Chamber to Drywell Vacuum Breaker Failed to Close After Testing - Suspect Air Operator Problem

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 5 0 0 0
0 9	1 8	8 7	8 7	0 1 2	0 0	1 0	0 7	8 7		0 5 0 0 0

OPERATING MODE (9)	4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)							
POWER LEVEL (10)	0 9 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)	___ 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)	X 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
David Hoogheem, Regulatory Assurance Ext. 2276	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 F	T V	A 5 8 5	Y					

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
Yes (If yes, complete EXPECTED SUBMISSION DATE)	___ NO		1 2	3 0	8 7

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

On September 18, 1987, Quad Cities Unit Two was in the RUN mode at 90 percent of core thermal power. At 1300 hours, while performing QOS 1600-1 (Suppression Chamber to Drywell Vacuum Breakers Monthly Exercise), the 2-1601-33E vacuum breaker remained open after testing. Efforts were directed at reclosing the vacuum breaker. At 1350 hours, these efforts were successful. Because of the stuck open vacuum breaker, NRC notification had been completed at 1346 hours. Position indication problems were also identified for vacuum breakers 2-1601-32A and 33A. Suppression chamber to drywell differential pressure was reestablished at 1725 hours.

The cause of the 2-1601-33E failure to initially close after testing is considered to be a problem with the air operator portion of the vacuum breaker and does not affect the operation necessary to mitigate the consequences of a loss of coolant accident. A supplemental report will be submitted following completion of repairs during the next cold shutdown of Unit Two. Since Unit One is in cold SHUTDOWN currently, its vacuum breakers are to be evaluated to identify mechanical, indication, and design problems. This report is submitted per 10 CFR 50.73(a)(2)(ii).

IE22

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 MWt rated core thermal power. Energy Industry Identification System (EIIS) codes are identified in the text as [XX].

EVENT IDENTIFICATION: While testing suppression chamber to drywell vacuum breakers, the 2-1601-33E stuck open for 50 minutes.

A. CONDITIONS PRIOR TO EVENT:

Unit: Two Event Date: September 18, 1987 Event Time: 1300
Reactor Mode: 4 Mode Name: RUN Power Level: 90%

This report was initiated by Deviation Report D-4-2-87-044

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:

On September 18, 1987 Quad Cities Unit Two was in the RUN mode at 90 percent of rated core thermal power. At 0207 hours, QOS 1600-1 (Suppression Chamber [NH] to Drywell [NH] Vacuum Breakers [BF, VACB] Monthly Exercise) was begun. The first vacuum breaker valve tested, 2-1601-32A, cycled open successfully but indicated a dual position on both Divisions I and II after the testing. Technical Specification 3.7.A.4.b. states:

> "Any pressure-suppression chamber-drywell vacuum breaker may be non-fully closed as indicated by the position indication and alarm systems provided that drywell to suppression chamber differential pressure decay rate is demonstrated to be not greater than 25% of the differential pressure decay rate for all vacuum breakers open the equivalent of 1/16 inch at all points along the seal surface of the disk."

As a result, the drywell/suppression differential pressure (dp) was reestablished at 0250 hours and then QOS 1600-27 (Suppression Chamber to Drywell Pressure Separation Test with >/=1.2 PSID Estabiished Between Drywell and Suppression Chamber (Drywell Inerted)) was satisfactorily completed. This test satisfied the requirements of the above referenced specification.

At 0550 hours, electrical blocks (numbers 3954 and 3955) were installed to allow resetting the vacuum breaker position annunciator alarms on the 902-3 panel in the control room, and to clear the red "open" lights at the local control panel 2252-24. At 0825 hours, testing resumed per QOS 1600-1. Vacuum breakers 2-1601-32B through F operated satisfactorily but vacuum breaker 2-1601-33A, also indicated dual position on Division I following the testing. At 0900 hours, the separation test (QOS 1600-27) was performed again successfully to satisfy Specification 3.7.A.4.b. referenced above and Specification 3.7.A.4.c. which states that

> "reactor operation may continue provided that no more than one quarter of the number of pressure suppression chamber-drywell vacuum breakers are determined to be inoperable provided that they are secured or known to be in the closed position."

Both the 2-1601-32A and 33A were known to be in the closed position because the separation test was successfully performed. There are twelve suppression chamber-drywell vacuum breakers and only two were displaying indication problems. At 1140 hours, electrical blocks (numbers 3956 and 3957) were installed to reset the annunciator alarms on the 902-3 panel and to clear the red "open" light at the local control panel.

Subsequently, testing per QOS 1600-1 resumed and at 1300 hours, vacuum breaker 2-1601-33E stuck fully open when tested. Attempts were initiated immediately to reclose the vacuum breaker. These efforts included further manipulations of the vacuum breaker test pushbutton and isolation of the air supply to the vacuum breaker test solenoid.

At 1346 hours, the NRC was notified via the Emergency Notification System (ENS) to satisfy the requirements of 10 CFR 50.72(b)(1)(ii) because of the stuck open vacuum breaker. However, at 1350 hours, as a result of the continuing efforts to close the 2-1601-33E vacuum breaker, the vacuum breaker was closed. Then the drywell-suppression chamber dp restoration was begun.

At 1630 hours it was apparent that the drywell-suppression chamber dp restoration was not proceeding normally, so the nine vacuum breakers that were considered available were cycled again to ensure that they were all reseated. All but the 2-1601-32A, 33A and 33E were cycled. As a result, dp buildup was improved and at 1703 hours, the dp of 1.2 psid required by Technical Specification 3.7.A.6.a. was established. This Specification states that

> "differential pressure between the drywell and suppression chamber shall be maintained at equal to or greater than 1.20 psid except this differential may be decreased to less than 1.20 PSID for a maximum of 4 hours during required operability testing of the HPCI system pump, the RCIC system pump, the drywell-pressure suppression chamber vacuum breakers, and reactor pressure relief valves.

If the Specifications of 3.7.A cannot be met, and the differential pressure cannot be restored within the subsequent six (6) hour period, an orderly shutdown shall be initiated and the reactor shall be in a cold shutdown condition in the following 24 hours."

At 1725 hours, the separation test (QOS 1600-27) was completed satisfactorily. The dp was lost at 1300 hours when the 2-1601-33E was tested and stuck open. By 1703 hours the dp was reestablished. As a result, only 3 minutes of the six hours allowed by the Technical Specification were exhausted.

C. APPARENT CAUSE OF EVENT:

This report is submitted to comply with 10 CFR 50.73(a)(2)(ii), which requires the reporting of any event or condition that resulted in the condition of the nuclear power plant, including its principal safety barriers, being seriously degraded.

The cause for the 2-1601-33E vacuum breaker failure to close and apparent position indication problem on the 2-1601-32A and 33A has not been determined. The 2-1601-33E closure failure was evaluated and station management concluded that the problem is with the test (air operator/solenoid) portion of the vacuum breaker. This problem would not affect the vacuum breaker's ability to properly operate in the event it was needed.

The suppression chamber-drywell vacuum breakers are located inside the suppression chamber which is inerted with nitrogen during unit operation. Therefore, the failure mode has not been confirmed because of this inaccessibility. The cause for the vacuum breaker problems will be determined when conditions are such that the suppression chamber can be entered, i.e., a cold shutdown condition. Information regarding cause will be provided in a supplemental report.

D. SAFETY ANALYSIS OF EVENT:

The 2-1601-33E vacuum breaker is one of twelve vacuum breakers that are provided to relieve noncondensables to the drywell from the suppression chamber. The capacity of the vacuum breakers is designed to limit the dp between the drywell and suppression chamber to 0.5 psi to maintain the structural integrity of the containment. The design flow can be achieved with 25 percent of the vacuum breakers closed without exceeding the 0.5 psi differential pressure limit.

In the event of a Loss of Coolant Accident (LOCA) with the suppression chamber to drywell vacuum breakers stuck open, some of the steam created by the LOCA would flow from the drywell to the suppression chamber atmosphere through the vacuum breaker, resulting in incomplete condensation of the steam during the blowdown. This would raise the suppression chamber pressure above the pressure as analyzed with all vacuum breakers closed. Two design features assist with resolution of this equipment problem:

1. The high velocity steam passing through the valve would tend to close the valve.

2. Steam which would be passed through the unclosed valve could be condensed through the use of the Suppression Pool Spray subsystem of the Residual Heat Removal [BO] system.

Station management discussed the problem with this vacuum breaker and concluded that based on the indications observed while trying to reclose the valve, it was apparent that the problem was with the air operator portion of the valve. Each time the vacuum breaker test button was operated (given an open signal) from the local control panel, it took longer to have the green "closed" indication go out. Since the air operator is for test purposes only and does not perform any function when the valve operates as a vacuum breaker, it was agreed that the 2-1601-33E would still perform as required during a LOCA.

As a precautionary measure, this vacuum breaker was declared inoperable (but only for testing) per QOS 1600-02 (Suppression Chamber-Drywell Vacuum Breakers Inoperable).

Because the 2-1601-32A showed dual indication in both Division I and II position indicating and alarm systems, it was declared inoperable per QOS 1600-2. The safety significance of this condition is minimal because this vacuum breaker and the 2-1601-33A are still capable of performing their function during a LOCA. Vacuum breaker position indication is to provide indication that valve opening exceeds the equivalent of 1/16 inch at all points along the seal surface of the disk. (T.S. 3.7.A.4.a.3) Closure integrity of all valves is assured by satisfactory completion of the separation test (QOS 1600-27). The vacuum breakers will continue to be tested every 15 days per Specification 3.7.A.4.d which states,

> "if failure occurs in one of the two-position alarm systems for one or more vacuum breakers, reactor operation may continue provided that a differential pressure decay rate test is initiated immediately and performed every 15 days thereafter until the failure is corrected."

E. CORRECTIVE ACTION:

Nuclear Work Requests (WR) have been initiated on the 2-1601-32A (WR # Q60289), 2-1601-33A (WR# Q60288), and 2-1601-33E (WR # Q60285). The vacuum breakers will be inspected and repaired as required during the next cold shutdown of Unit Two. This will be tracked with the Nuclear Tracking System (NTS) number 2652008704401.

Since Quad Cities Unit One is currently in a refuel and maintenance outage, the Unit One suppression chamber-drywell vacuum breakers are to be inspected and evaluated in an effort to identify mechanical, indication, and design problems. Appropriate corrective action will be developed following this evaluation. This will be tracked with NTS number 2652008704402.

F. PREVIOUS EVENTS

Licensee Event Report (LER)	Description
265/87-004	2-1601-33A failed to close due to dimpled bushing and/or corroded solenoid.

Reportable Occurrence	Description
265/82-22/03L	2-1601-33A Stainless steel packing and stuffing box bushing bound to the shaft caused failure to close.
265/82-06/03L	2-1601-32C counterweight mispositioned.

G. COMPONENT FAILURE DATA:

The vacuum breakers are 18 inch swing-check valves manufactured by Atwood and Morrill Company, Incorporated. The air test cylinder is manufactured by Atwood and Morrill, model number 20781-F.

Commonwealth Edison

DEVIATION REPORT

DVR NO. 04 - 2 - 87 - 044
STA UNIT YEAR NO.

PART 1 TITLE OF DEVIATION

LOSS OF DW TO TORUS DP.

OCCURRED 9/18/87 DATE 1300 TIME

SYSTEM AFFECTED 1600

PLANT STATUS AT TIME OF EVENT MODE RUN, POWER(%) 90

060285 WORK REQUEST NO.

TESTING [X] YES [ ] NO

DESCRIPTION OF EVENT

WHILE PERFORMING QOS 1600-S1, DW TO TORUS VACUUM BREAKER OPERABILITY, 2-1601-33E STUCK FULL OPEN. AT 1400 THE VALVE WAS CLOSED. AT 1703 DW TO TORUS DP WAS REESTABLISHED AND THE DP DECAY TEST WAS SATISFACTORILY PERFORMED (QOS 1600-27).

POTENTIALLY SIGNIFICANT EVENT PER NSO DIRECTIVE A-07 [ ] YES [X] NO

10CFR50.72 NRC RED PHONE NOTIFICATION MADE [X] 1 HOUR [ ] 4 HOUR 1346 TIME [ ] NO

ANTHONY FUHS RESPONSIBLE SUPERVISOR 9/18/87 DATE

PART 2 OPERATING ENGINEER'S COMMENTS

WORK REQUESTS HAVE BEEN WIRTTEN ON EACH OF THE SUSPECT VACUUM BREAKERS AND EACH WI BE REPAIRED AT THE NEXT COLD SHUTDOWN OUTAGE OF THE UNIT. FOR THE TIME BEING THE 33E VALVE HAS BEEN DECLARED INOPERABLE IN ACCORDANCE WITH TECH SPEC.

[ ] NON REPORTABLE EVENT

[XX] 30 DAY REPORTABLE/10CFR 50.73(a)(2)(ii)

[ ] 5 DAY REPORT PER 10CFR21

[ ] ANNUAL/SPECIAL REPORT REQUIRED

A.I.R. # .....

L.E.R. # 87-012..

NOTIFICATION _____ REGION III _____ DATE _____ TIME

_____ NSO _____ DATE _____ TIME

[ ] CECO CORPORATE NOTIFICATION MADE IF ABOVE NOTIFICATION IS PER 10CFR21

TELECOPY _____ CECO CORPORATE OFFICER _____ DATE _____ TIME

PRELIMINARY REPORT COMPLETED AND REVIEWED B. STRUB OPERATING ENGINEER 9/20/87 DATE

INVESTIGATION REPORT & RESOLUTION ACCEPTED BY STATION REVIEW

B Strub

C. Tietz

RESOLUTION APPROVED AND AUTHORIZED FOR DISTRIBUTION

B Mat STATION MANAGER 10-14-87 DATE

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

RLB-87-278

October 7, 1987 - D9

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 please find Licensee Event Report (LER) 87-012, 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)(ii), which requires the reporting of any event or condition that resulted in the conditionn of the nuclear power plant, including its principal safety barrier, being seriously degraded.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/MSK/ekb

Enclosure

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

1078H

IE22
1/1