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RLB-93-068

April 28, 1993

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) 93-008, 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)(ii)(B). Any event or condition that resulted in the condition of the nuclear power plant, including its principal safety barriers being seriously degraded, or that resulted in the nuclear plant being in a condition that was outside the design basis of the plant.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/TB/plm

Enclosure

cc: J. Schrage
T. Taylor
INPO Records Center
NRC Region III

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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1)	Docket Number (2)	Page (3)
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Title (4)

Recirc Pipe 2-0209B" Has Through Wall Crack Due To Probable Weld Defect

Event Date (5) Month	Day	Year	LER Number (6) Year	Sequential Number	Revision Number	Report Date (7) Month	Day	Year	Other Facilities Involved (8) Facility Names	Docket Number(s)
										0 5 0 0 0
0 4	0 2	9 3	9 3	0 0 8	0 0	0 4	2 8	9 3		0 5 0 0 0

OPERATING MODE (9): 1

POWER LEVEL (10): 0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

__ 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	
Thomas Kuksuk, ISI Coordinator	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	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
X	A D	P S X	D 2 4 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

__ Yes (If yes, complete EXPECTED SUBMISSION DATE) X NO

Expected Submission Date (15): Month | Day | Year

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

ABSTRACT:

On March 6, 1993, Quad Cities Unit Two was shut down to begin the twelfth refueling and maintenance outage. On March 31, 1993, with the reactor mode switch in SHUTDOWN, a visual inspection revealed a Recirculation weld area (ISI Weld 02-F2B) with water seeping from a small crack. The exact cause of the crack indication has not been determined but it is being postulated to come from either a weld defect, a crevice assisted Intergranular Stress Corrosion Crack (IGSCC) or from high cycle vibration fatigue. Corrective actions for this situation will be to apply a weld overlay, to allow continued operation for one fuel cycle. If an inspection technique cannot be developed to reliably examine the weld overlay, the area will be repaired next outage. This report is being submitted to comply with the requirements of 10CFR50.73(a)(2)(ii), which requires the reporting of any event or condition that resulted in the condition of a nuclear power plant, including its principal safety barriers, being seriously degraded.

PLANT AND SYSTEM IDENTIFICATION:

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

EVENT IDENTIFICATION: Recirc pipe 2-0209B" has through wall crack due to probable weld defect.

A. CONDITIONS PRIOR TO EVENT:

Unit: Two	Event Date: April 2, 1993	Event Time: 1500
Reactor Mode: 1	Mode Name: SHUTDOWN	Power Level: 0%

This report was initiated by Deviation Report D-4-02-93-025.

SHUTDOWN Mode (1) - In this position, a reactor scram is initiated, power to the control rod drives is removed, and the reactor protection trip systems have been deenergized for 10 seconds prior to permissive for manual reset.

B. DESCRIPTION OF EVENT:

On March 6, 1993, Quad Cities Unit Two was shut down to begin the twelfth refueling and maintenance outage. On March 31, 1993, with the reactor mode switch in SHUTDOWN, a radiation technician was performing routine radiation surveys of drywell piping. While performing smears of the 0202-6B valve, he noted high smearable contamination (along with Beta radiation) in the vicinity of a 2" pipe-to-valve sockolet weld (ISI Weld 02-F2B). The Inservice Inspection group (ISI) was notified and subsequent non-destructive examinations (NDE) were performed. A VT-2 exam verified leakage coming from a linear indication at the toe of the fillet weld on the 2" pipe side. A Liquid Penetrant exam (PT) showed the size of this indication to be approximately 3/32" to 5/32" long. A best effort Ultrasonic Inspection (UT) was then performed to identify the crack orientation. The UT could only confirm that the crack was not oriented in a traverse direction in the pipe wall, that is, running between the pipe's inner diameter (ID) and the outer diameter (OD). The crack orientation is likely to be running from the crevice created by the sockolet configuration, under the fillet weld, and penetrating to the surface at the toe of the weld.

C. APPARENT CAUSE OF EVENT:

This report is being submitted to comply with the requirements of 10CFR50.73(a)(2)(ii), which requires the reporting of any event or condition that resulted in the condition of a nuclear power plant, including its principal safety barriers, being seriously degraded. The exact cause of the crack indication has not been determined but it is being postulated, due to the crack orientation, to have come from one of following causes. The first, which is the most probable, is a weld defect. The crack would have been initiated at the weld defect and had propagated by service induced stresses. The second cause, due to configuration of the sockolet, is a crevice assisted Intergranular Stress Corrosion Crack (IGSCC). Even though weld 02-F2B is not a full penetration weld, a heat affected zone (HAZ) still exists adjacent to the legs of the fillet weld. Through wall propagation of an IGSCC crack along the HAZ is still possible within a weldment of this type. The third cause could have been from high cycle vibration fatigue. But, as indicated by the UT inspection, there were no flaws detected in the planes perpendicular to the pipe axis. Therefore, CECo has determined that high cycle fatigue was not a probable contributor to the initiation and propagation of the crack.

D. SAFETY ANALYSIS OF EVENT:

The probable consequences of this event were minimal. Crack indications in this type of material, type 304 stainless steel, have been demonstrated to propagate at a very slow rate. Therefore, a 100 percent through-wall crack would be easily detected using existing Primary Containment leakage monitoring system and temperature monitoring before complete failure would occur (leak before break). Safe operation of the Reactor was not jeopardized as a result of this occurrence.

E. CORRECTIVE ACTIONS:

The weld will be repaired with a "full structural" design weld overlay. This repair has been designed using the requirements of NUREG-0313 (rev. 2) and the ASME Boiler and Pressure Code Section XI as guidance. This is not an approved code repair and approval has been granted by the Nuclear Regulatory Commission (NRC) for operation for one fuel cycle. At the next refueling outage, the repaired weld will be removed and an acceptable code repair performed, unless a reliable method for examining the weld overlay can be developed. During the application of the overlay, each layer will be liquid penetrant examined to verify that the overlay is free of cracks. After the overlay is finished, a hydrostatic test at 1110 psig will be conducted prior to the unit startup (NTS#2652009302501).

F. PREVIOUS EVENTS:

There have been two previous events at Quad Cities, since 1988 that are similar to this. Incidents similar to this involving weld crack indications on stainless steel piping systems are documented in the following Event Reports:

Unit Two:

DVR 04-02-88-022/ RWCU pipe 2-1202-6" has through wall crack

LER 04-02-88-008 Indications due to Intergranular Stress Corrosion Cracking

DVR 04-02-88-32 U-2 Recirc system crack indications due to Intergranular Stress Corrosion Cracking

A search was done on The Nuclear Plant Reliability Data System (NPRDS) and several incidents of IGSCC and fatigue cracking of welds were reported.

G. COMPONENT FAILURE DATA:

It was determined by the (NPRDS) coordinator that this event was not reportable. Even though the flaw was through wall, no catastrophic failure occurred and the valve still performed its intended function. Relevant component data is discussed in the Description the Event Section (of this report).