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JCD

RLB-90-303

December 10, 1990

U. S. Nuclear Regulatory Commiss
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) 90-030, 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): The licensee shall report any event or condition that resulted in the nuclear power plant being in a condition that was outside the design basis of the plant.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

R.A. Robey for
R. L. Bax
Station Manager

RLB/MJB/jso

Enclosure

cc: R. Stols
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)
Quad Cities Unit One	0 5 0 0 0 2 5 4	0 1 of 0 4

Title (4)

Reactor Recirculation Piping Outside Seismic Design Basis Due to a Design Discrepancy

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)
									QUAD CITIES	0 5 0 0 0 2 6 5
1 1	0 8	9 0	9 0	0 3 0	0 0	1 2	1 0	9 0		0 5 0 0 0

OPERATING MODE (9): 4

POWER LEVEL (10): 0 9 2

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	
Richard Swart, Tech Staff ext. 2115	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)

___ 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 November 8, 1990 at 1145 hours, Unit One and Unit Two were in the RUN mode at 92 percent and 78 percent of rated core thermal power, respectively. At this time, ABB Impell Corporation informed the station that the Reactor Recirculation (RR) piping of both units was potentially outside of seismic design basis. Operability was verified and no immediate action was required. An Emergency Notification System (ENS) phone notification was completed at 1241 hours as required by 10CFR50.72(b)(1)(ii)(B).

The apparent cause of this event is a design discrepancy which occurred during seismic modeling. The RR pumps have five directional supports installed but were seismically analyzed to have six directional supports. A revised analysis using the five directional support model detected large increases in snubber loads that exceeded seismic design basis. Corrective action for this event is to modify the existing pipe whip restraints to act as lateral supports. This report is being submitted in accordance with 10CFR50.73(a)(2)(ii)(B).

PLANT AND SYSTEM IDENTIFICATION:

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

EVENT IDENTIFICATION: Reactor Recirculation Piping Outside Seismic Design Basis Due to A Design Discrepancy.

A. CONDITIONS PRIOR TO EVENT:

Unit: One Event Date: November 8, 1990 Event Time: 1145
Reactor Mode: 4 Mode Name: RUN Power Level: 92%

This report was initiated by Deviation Report D-4-01-90-120

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 November 8, 1990 at 1145 hours, both units were in the RUN mode. Unit One was at 92 percent and Unit Two was at 78 percent of rated core thermal power. At this time, ABB Impell Corporation informed the station that the Reactor Recirculation (RR)[AD] Piping of both units was potentially outside of the seismic design basis as defined in the Final Safety Analysis Report (FSAR). ABB Impell Corporation provided a Qualitative Operability Evaluation of the RR Piping Systems which determined that the systems were operable. No immediate action was required by the station. An Emergency Notification System (ENS) phone notification was completed at 1241 hours as required by 10CFR50.72(b)(1)(ii)(B).

C. APPARENT CAUSE OF EVENT:

This report is being submitted to comply with 10CFR50.73(a)(2)(ii)(B) which requires that the licensee report any event or condition that resulted in the plant being in a condition that was outside the design basis of the plant.

The apparent cause of this event is a design discrepancy which occurred during seismic modeling (analysis). An analysis discrepancy was found in which the RR pumps were being seismically modeled using six directional supports [SPT] in lieu of the actual five directional support configuration.

The original piping analysis provided by John A. Blume and Associates in 1968 indicates that the RR system was anchored at points on the RR pump [P] suction and discharge nozzles [NZL].

The model was set up with the RR pumps having six directional supports, (a snubber on the pump discharge valve). With six directional supports, the pump can be considered to be an anchor. However, with the actual five directional support configuration (no snubber on the pump discharge valve), the assumption that the pump acts as an anchor is invalid. Subsequent analyses using the original model were based on the assumption that the RR pump was an anchor.

During the 1986 Recirc Pipe Replacement (RPR) modification at Dresden Unit Three, it was discovered by ABB Impell Corporation that Quad Cities Units One and Two RR Pumps only had five directional supports. It then became apparent that the assumption that the pump acts as an anchor was incorrect, and the model was revised using scaling factors from the Dresden RPR analysis. A non conservative judgement was made as to the similarity between Dresden Unit Three and Quad Cities Units One and Two when the Dresden Three results were extrapolated to consider the effects of the revised model on the Quad Cities units. Utilizing this analysis, the Quad Cities RR Piping was determined to be within design basis.
Between 1986 and 1990, the simplified 1986 scaled piping model was used for many evaluations such as weld overlay pipe shrinkage, whip restraint gaps, thermal mode effects, changes in support configurations, Furmanite clamp, and others. It was determined that it would not be cost effective to update the computerized scaled piping model for these projects. Design basis changes were evaluated individually using the simplified analysis methods.

In 1990, ABB Impell Corporation reviewed the many changes made to the RR piping system model and decided to consolidate these changes into a single new RR piping analysis. When the new analysis was applied to Quad Cities Unit Two, significant load increases were detected.

D. SAFETY ANALYSIS OF EVENT:

This event was of minimal safety consequences in terms of plant and personnel safety. Engineering has determined that the operability criteria of the RR piping, piping supports, and structural steel has been satisfied. The operability determination was made by comparing the RR piping, support, and structural steel operability evaluation methods to operability criteria contained in an August 17, 1989 CECo transmittal to the NRC. The 1989 submittal was made to the NRC defining the operability criteria for Quad Cities. The piping, support, and structural steel evaluation methods meet the NRC submittal acceptance criteria with one exception, snubber M-1022D-1. Operability of this snubber was demonstrated using Pacific Scientific test data for the snubber and clamp analysis which allows the formation of plastic hinges and yielding.

Experience with piping systems during real earthquakes indicates a loss of piping pressure integrity rarely occurs during seismic events. Much of this experience is based on non-seismically designed piping systems in fossil-fuel plants. The experience information indicates that the seismically designed Quad Cities RR System will maintain pressure integrity during and after seismic events. Based on past experience with operability analysis on Quad Cities RR piping/support systems, operability has always been demonstrated.

E. CORRECTIVE ACTIONS:

No immediate corrective actions were necessary as the systems were determined to be operable. The analysis model used in evaluating the RR system has now been updated by ABB Impell Corporation to reflect the current conditions.

To correct for the increased loads, additional support will be adde. the RR piping. Minor design change MC4-1-90-157 is being assembled to complete the needed changes. (NTS 2542009012001).

In regard to the design discrepancy by the Architect Engineer (A/E), the station will submit a letter to the CECo Corporate Design Support Department (DSD). This letter will inform DSD of the A/E design errors encountered at the station, request a review be completed for adverse trends, and their corrective action if an adverse trend is found. (NTS 2542009012002).

F. PREVIOUS EVENTS:

There have been other LERs where systems were found outside design basis as a result of A/E errors:

LER #	DESCRIPTION
254/90-022	Piping system outside FSAR compliance caused by A/E computer user input error.
254/88-004	Piping outside FSAR allowable stress caused by A/E design error.
265/89-003	Inadequate design - Interlock Doors.
265/89-004	Inability of ACAD to perform caused by design error.
265/88-006	Flued Head Anchors outside design due to A/E analysis deficiency.
265/88-012	Improper design of RWCU supports during modification.
265/87-019	HPCI piping supports outside design due to A/E error.
254/86-022	Pre-Service design error due to inadequate drawing and design control by A/E.
254/86-024	RHR Service Water piping supports inadequate design control by A/E.

Based on the corrective actions in progress, no further action is deemed necessary at this time.

G. COMPONENT FAILURE DATA:

No component failure is associated with this event.