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Quad Cities Generating Station
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ComEd

LWP-96-016

September 20, 1996

U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Document Control Desk

Reference: Quad Cities Nuclear Power Station
Docket Number 50-254, DPR-29, Unit One
50-265, DPR-30, Unit Two

Enclosed is Licensee Event Report (LER) 96-016, 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)(v)(D). The licensee shall report any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to mitigate the consequences of an accident.

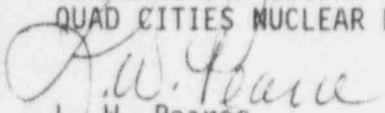
The following commitments are being made by this letter:

1. Take measures to minimize the potential of inadvertent damage to the bottom row of explosion bolts by December 31, 1996.

If there are any questions or comments concerning this letter, please refer them to Charles Peterson, Regulatory Affairs Manager at 309-654-2241, ext. 3602.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION


L. W. Pearce
Station Manager

LWP/NC/as
Enclosure

cc: A. B. Beach, Regional Administrator, Region III
R. M. Pulsifer, Project Manager, NRR
C. Miller, Senior Resident Inspector, Quad Cities
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LICENSEE EVENT REPORT (LER)															Form Rev. 2.0													
Facility Name (1) Quad Cities Unit One										Docket Number (2) 0 5 0 0 0 2 5 4					Page (3) 1 of 0 5													
Title (4) Secondary containment would not have satisfied all UFSAR requirements due to the siding's explosion bolts which were damaged by either high winds or ineffective work practices.																												
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)			01		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																							
POWER LEVEL (10)			0		20.402(b)				20.405(c)				50.73(a)(2)(iv)				73.71(b)											
					20.405(a)(1)(i)				50.36(c)(1)				<input checked="" type="checkbox"/> 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)				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																		
Charles Peterson, Regulatory Affairs Manager, Ext. 3602										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																			
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)																		
YES (If yes, complete EXPECTED SUBMISSION DATE)										Month Day Year																		
<input checked="" type="checkbox"/> NO																												
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																												

ABSTRACT:

At approximately 0230 on May 10, 1996 a tornado caused structural damage to the metal siding that forms the secondary containment barrier for the refueling floors on both Units. Subsequent documented inspections revealed approximately 270 (out of 1496) damaged explosion bolts. It was observed that not all of the damaged bolts were a result of this tornado. At 1800 on August 23, 1996 it was concluded, through calculations, that not all of the design requirements for the siding would have been met and this would have placed secondary containment in an inoperable condition. An Emergency Notification System (ENS) notification was made at 2010 on August 23, 1996.

The previously damaged explosion bolts were damaged by either a sufficient pressure load (by design) or by ineffective work practices. The bottom row of bolts currently have the greatest potential to be damaged by ineffective work practices and measures will be taken to minimize this potential. The damaged bolts located in the upper rows were subject to this type of damage during the original construction of the siding or nearby components. All damaged bolts were replaced prior to the restart of either Unit. The explosion bolts will be inspected periodically as part of the Structures Monitoring Program (Maintenance Rule).

The safety significance of the damaged explosion bolts is minimal. The required negative reactor building pressure was maintained at all times. Calculations indicate that the siding would have remained functional during a design wind event and in compliance with the Updated Final Safety Analysis Report (UFSAR) during a seismic event.

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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: Secondary containment would not have satisfied all UFSAR requirements due to the siding's explosion bolts which were damaged by either high winds or ineffective work practices.

A. CONDITIONS PRIOR TO EVENT:

Unit : One	Event Date: August 23, 1996	Event Time: 1800
Reactor Mode: 1	Mode Name: Shutdown	Power Level: 000%
Unit : Two	Event Date: August 23, 1996	Event Time: 1800
Reactor Mode: 4	Mode Name: Run	Power Level: 100%

This report was initiated by Licensee Event Report LER254\96-016

SHUTDOWN (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.

RUN (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:

At approximately 0230 on May 10, 1996 a tornado caused several outer panel sections of the reactor building [NG] siding to be removed. Walkdowns to determine the extent of damage and scope of the repair were conducted which included 100% of the explosion bolts and all of the siding. Approximately 270 (out of 1496) explosion bolts were found damaged. These bolts are designed to "fail" at a predetermined differential pressure across the relief panels to protect the superstructure.

During the documented inspection of the explosion bolts, it was observed that not all of the damaged bolts were a result of the May 10th tornado. This was noted mainly because the ends of several damaged bolts were painted. The exact number of non-tornado damaged bolts is not known and all of the damaged explosion bolts were replaced prior to the start of either Unit.

Evaluations were performed to determine the past functionality of the degraded siding. On August 23, 1996 it was determined that not all of the design requirements for the siding would have been met when the number and location of the damaged explosion bolts were accounted for. It was concluded at 1800 on August 23, 1996 that this would have placed secondary containment in an inoperable condition. A subsequent Emergency Notification System (ENS) notification was made at 2010 on August 23, 1996.

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

C. APPARENT CAUSE OF EVENT:

The explosion bolts are designed to "fail" in tension via a necked down shank. Since the necked down portion is located inside the building, the bolts are susceptible to damage from the inadvertent dropping of hand tools or similar items of sufficient mass onto the bolt shanks. The bottom row of bolts are most susceptible to this as they are located at the base of the siding at the refuel floor elevation.

The as-found previously damaged explosion bolts could also have been caused by localized pressure loadings from high winds that would result in the particular bolts reaching the predetermined failure load. This can not be ruled out since the site has experienced high winds and there was no inspection program to evaluate the effects on the explosion bolts. In the future, this type of event would initiate an inspection via the Structures Monitoring Program (Maintenance Rule).

Corrosion is not considered a credible cause for two reasons: (1) the explosion bolts are made from aluminum and thus not subject to a ferrous type corrosion mechanism and (2) the bolts are protected from the elements by insulation and the outer siding panels.

D. SAFETY ANALYSIS OF EVENT:

The pressure relief panels have two main design functions. One is to relieve internal pressure via explosion (load-rated) bolts to protect the superstructure. This design feature is not compromised by the damaged explosion bolts as the relief mechanism would occur at a pressure less than the design value. The other main function of the relief panels and the siding in general is to provide an air containment and gas control boundary (secondary containment). The analysis to determine off-site release following a predetermined accident scenario relies on the siding to maintain a leakage control barrier while the air inside the reactor building is treated and subsequently released through the chimney (elevated release point). The affect of the previously damaged explosion bolts on secondary containment is discussed below.

According to UFSAR section 6.2.3.2, secondary containment applies four methods to mitigate the consequences of a postulated Loss-of-Coolant-Accident (LOCA) (pipe break inside the drywell) and the refueling accident (fuel assembly drop). The only method that applies to the siding is to maintain a negative pressure in the reactor building so that leakage is inward under calm wind conditions and any exfiltration due to high wind conditions is minimized.

UFSAR Table 6.2-5 provides the design parameters for secondary containment of which three apply to the siding. The first is normal operation pressure of -0.1" to -0.25" of water gauge. The second is post accident pressure of -0.25" of water gauge. The third is post accident inleakage (100%/day) of secondary containment volume equal to the standby gas treatment system flow of 4000 standard cubic feet per minute (scfm).

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The periodic testing of the secondary containment system is required by Technical Specifications to be successfully completed to allow the startup or continued operation of either Unit. The -0.25" of water gauge and 4000 scfm inleakage are requirements that must be satisfied to successfully complete the secondary containment test. Also, the ability to maintain the required negative reactor building pressure is continually monitored. During the time period the previously damaged explosion bolts were undiscovered, the ability to maintain the required negative pressure and inleakage was satisfactorily demonstrated by this continuous monitoring and periodic testing.

UFSAR section 6.2.3.1 (secondary containment design bases) indicates the reactor building is designed to contain a positive pressure of 7" water gauge without structural failure and pressure relief. Subsequent evaluations indicate this requirement is not associated with the reactor building siding. Specification 13524-069-N202 contains the environmental zone maps utilized at Quad Cities for the environmental qualification of components. Figure 5 (zone 40) from this specification pertains to the refuel floor and depicts the environmental conditions the siding would be subject to during a high energy line break (HELB) or LOCA as well as normal operating conditions. Under no scenario does the pressure on the refuel floor deviate from one atmosphere.

The reactor building (and thus the siding) is designed in accordance with Class I loads, load combinations and stress limits described in UFSAR section 3.8.4. An evaluation of the siding was performed taking into account the number and location of damaged explosion bolts. The results of this evaluation indicate the functional safety requirements of the siding were not compromised even though not all of the UFSAR specified design parameters for the siding would be satisfied. Specifically, the siding would remain functional under the -0.25" water gauge pressure and the 100 year design wind (110 mph). The siding meets the UFSAR requirements under the -0.25" water gauge pressure and the design seismic events. However, the calculations indicate the siding would not have remained functional under an extreme wind (170 mph) nor the 7" water gauge of positive pressure depicted in the UFSAR. Note, the siding is not subject to any internal pressure loads resulting from a HELB or LOCA.

It can be concluded the safety significance of the previously damaged explosion bolts is minimal.

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

E. CORRECTIVE ACTIONS:Corrective Actions Completed:

1. All of the damaged explosion bolts have been replaced.
2. On July 10, 1996 Quad Cities implemented the Structures Monitoring Program (part of the Maintenance Rule) under which the explosion bolts will receive a periodic routine inspection and a special inspection following a significant event.
3. On September 12, 1996 ComEd Nuclear Operations Notification (NON) QC-04-96-018 describing the damaged explosion bolts was transmitted to ComEd's other nuclear facilities.

Corrective Actions to be Completed:

1. Take measures to minimize the potential of inadvertent damage to the bottom row of explosion bolts by December 31, 1996 (NTS 2541809601601, Design Engineering).

F. PREVIOUS EVENT:

Two Licensee Event Reports were issued in the past that are associated with high winds/tornado activities. They are:

1. LER 254/90-006 "Tornado touched down on site"
2. LER 254/96-007 "A tornado damaged secondary containment which required a shutdown of Unit 2"

G. COMPONENT FAILURE DATA:

Not applicable.