



Commonwealth Edison

Quad Cities Nuclear Power Station
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STM-94-009

November 11, 1994

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) 94-013, Revision 00, for Quad Cities Nuclear Power Plant.

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 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.

The following commitments are being made by this letter:

- ComEd will implement a modification to resolve the nonconformance of the system with the Safe Shutdown Analysis. This modification will be the installation of a manual bypass switch for the Unit 1 EDG HVAC system (equivalent to the bypass switch on the 1/2 EDG HVAC system).
- ComEd will revise Safe Shutdown Procedures QARP 700-1 and QARP 1300-1 to specifically address the actions to take if a fire in the central Turbine Building impacts the ability to start and operate the EDG HVAC systems.

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
QUAD CITIES NUCLEAR POWER STATION

E. S. Kraft Jr.
E. S. Kraft Jr.
Site Vice President
and Acting Station Manager

ESK/TB/plm

Enclosure

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

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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
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Title (4)

Nonconformance with 10 CFR 50 Appendix R Safe Shutdown Analysis separation requirements.

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)																				
1	0	1	2	9	4	9	4	-	0	1	3	-	0	0	1	1	1	1	9	4			0	5	0	0	0	2	6	5
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 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)			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)										TELEPHONE NUMBER									
NAME Jim Masterlark, System Engineering, Ext. 2619										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	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS					
B																			
SUPPLEMENTAL REPORT EXPECTED (14)										Expected Submission Date (15)									
YES (If yes, complete EXPECTED SUBMISSION DATE)										X NO									
ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)																			

ABSTRACT:

On October 12, 1994, Quad Cities Station, Units 1 and 2 were shutdown. While evaluating the applicability of an ENS Notification from Cooper Station, ComEd determined that three relays [RLY] which control the HVAC systems [VJ] for all three Emergency Diesel Generators (EDGs) [EK] could be impacted by a fire in a single fire zone. This report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(ii), "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 power plant being in an unanalyzed condition that significantly compromised plant safety." Causes for this event are inadequate change management for consideration of system interactions during the Safe Shutdown Analysis and inadequate verification and validation of the Safe Shutdown Analysis. Corrective actions include installation of manual bypass switches, procedure revisions, and a review of the Safe Shutdown Analysis.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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		94	013	00	

TEXT Energy Industry Identification System (EIS) 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: Nonconformance with 10 CFR 50 Appendix R Safe Shutdown Analysis separation requirements.

A. CONDITIONS PRIOR TO EVENT:

Unit: One	Event Date: October 12, 1994	Event Time: 18:55
Reactor Mode: 01	Mode Name: Shutdown	Power Level: 0

This report was initiated by Licensee Event Report LER 254\94-013.

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.

B. DESCRIPTION OF EVENT:

On October 7, 1994, System Engineering initiated a review of Safe Shutdown equipment based upon the information contained in an ENS Notification from Cooper Station on October 6, 1994. The Cooper Station ENS Notification indicated that the CO₂ Fire Suppression switches for the Emergency Diesel Generators (EDGs) [EK] were located in the same fire area.

As a result of the review at Quad Cities, System Engineering determined that the three relays [RLY] which trip the HVAC systems [VJ] for all three EDGs were located in the same Turbine Building electrical panel (panel 2212-47). These relays function to trip the EDG HVAC systems in the event of a fire in an EDG room.

In the event of a fire in the vicinity of these relays (Turbine Building Central Zone Group - Fire Area TB-II), two of the EDGs (the Unit 1 EDG and the Unit 1/2 EDG) are required to provide power for safe shutdown of the units. A fire in this fire area could potentially affect the relays, and therefore the HVAC system for all three EDGs. If the EDGs were running, a trip of the HVAC systems could cause them to overheat and render all of the EDGs inoperable. This configuration represents a nonconformance with the 10 CFR 50 Appendix R Safe Shutdown Analysis separation requirements for Quad Cities Station.

This report is being submitted in accordance with the requirements of 10 CFR 50.73(a)(2)(ii), "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 power plant being in an unanalyzed condition that significantly compromised plant safety."

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

C. APPARENT CAUSE OF EVENT:

The following is a summary of Conclusions and Causal Factors (C/F) relating to problems which may have influenced nonconformance with the 10 CFR 50 Appendix R Safe Shutdown Analysis separation requirements for Quad Cities Station:

Change Management - System Interactions not considered. (J.1.e., J.1.f.)

The process for development and review of Appendix R Safe Shutdown Analysis in this case did not effectively consider the effects of system interactions on the Safe Shutdown Analysis. During initial development of the Safe Shutdown Analysis (1988), the architect engineering firm performed an inadequate review of interactions of plant systems and components.

Change Management - Accuracy/effectiveness of change not verified or validated. (J.1.n.)

The inadequate review of plant systems and components for interactions was not recognized by ComEd during the verification and validation of the accuracy of the Safe Shutdown Analysis.

D. SAFETY ANALYSIS OF EVENT:

The safety consequences of the event were minimal based upon the defense-in-depth concept for detecting, suppressing, and mitigating the consequences of a fire, as well as the ability to quickly restore adequate ventilation for the 1/2 EDG and the Unit 1 EDG.

Variables affecting the risk of a fire in this fire zone can be calculated as the probability of an event (fire) occurring multiplied by the consequences (severity) of the event. Quad Cities Station uses a defense-in-depth concept, combining multiple administrative and physical barriers, to ensure that a safe shutdown condition is not impaired by an Appendix R type fire. The primary barrier is the prevention of the initiation of the fire (reducing the probability of a fire). This is accomplished through the use of administrative controls, e.g. procedures which control the amount of transient combustibles and the use of ignition sources (i.e. welding permits). In addition, the required Fire Protection Program training for station personnel has been effective in heightening the level of worker awareness, thereby reducing the probability of in-plant fires.

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The secondary, physical barriers are designed to mitigate or reduce the severity of a fire, if one were to start. This is accomplished by early detection and warning (detection equipment) and rapid (automatic) fire suppression systems. The automatic suppression systems are augmented by manual controls, including Fire Brigade teams and increased firewatch surveillances (compensatory measures) by Fire Protection personnel. The final physical barrier is designed to contain an unmitigated fire so that SSD equipment is not jeopardized. This is partially accomplished by using fire barriers to contain the spread of a fire within a single area.

In the event of an unmitigated fire in the affected fire zone, ComEd has determined that compensatory actions would be taken by operators in sufficient time to restore ventilation to the EDGs. Prompt operator actions would have prevented any damage to the EDGs and would have ensured that sufficient auxiliary power was available.

In the event of an Appendix R-magnitude fire, station procedures establish two five-person teams to safely shut down the operating units. One person on each team is dedicated to ensuring that adequate emergency power from the 1/2 EDG and Unit 1 EDG is available for all necessary safe shutdown equipment.

An Appendix R fire in the Turbine Building Central Zone Group - Fire Area TB-II would result in the loss of the three HVAC relays, as well as the 125 VDC control cables for the EDGs. Because of the loss of the 125 VDC control cables, the Unit 1 EDG and 1/2 EDG will not autostart (Unit 2 EDG will be completely unavailable due to the fire). Therefore, the top priority of the two teams will be the manual start of the Unit 1 and 1/2 EDGs (and all required auxiliaries).

To effect the manual start, the dedicated operator for each EDG will enter the respective EDG room and implement the manual start procedure. This procedure requires verification of the start of the EDG and all associated auxiliaries. Because of the impact of the fire on the three relays, the EDG HVAC systems will not start. At this point, the operators will immediately recognize and initiate troubleshooting and compensatory measures. Based upon interviews with operators, ComEd has determined that the immediate compensatory measures will include manual opening of the EDG room door and ventilation dampers.

Following these initial compensatory measures, the operator at the 1/2 EDG will manipulate a manual bypass switch for the 1/2 EDG HVAC trip signal per QCOA 6600-6, 1/2 Diesel Generator Room Vent Fan Failure, allowing a manual start of the 1/2 EDG HVAC system.

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

Based upon interviews with operators, ComEd has determined that the operator at the Unit 1 EDG room will recognize the need to rapidly establish ventilation within the room, and will obtain readily-accessible fans and portable generators. These additional fans will provide ventilation until station engineers identify the cause of the tripped HVAC and take actions to correct the situation.

Based upon the defense-in-depth approach for detection and mitigation of a fire, and the ability to restore ventilation for the 1/2 EDG and the Unit 1 EDG, the overall risk associated with the nonconformance with the 10 CFR 50 Appendix R Safe Shutdown Analysis separation requirements is not significant.

E. CORRECTIVE ACTIONS:

1. ComEd will implement a modification to resolve the nonconformance of the system with the Safe Shutdown Analysis. This modification will be the installation of a manual bypass switch for the Unit 1 EDG HVAC system (equivalent to the bypass switch on the 1/2 EDG HVAC system). (Modification Design Engineering, NTS 2541809401301)
2. ComEd will revise Safe Shutdown Procedures QARP 700-1 and QARP 1300-1 to specifically address the actions to take if a fire in the central Turbine Building impacts the ability to start and operate the EDG HVAC systems. (Systems Engineering, NTS 2541809401302)

In response to LER 1-93-016 ComEd committed to develop an action plan that would call for re-validation and reverification of the Safe Shutdown Analysis. The original intent of this reverification was to evaluate the Appendix R Program. ComEd will evaluate the plant configuration and determine if further separation issues exist. This evaluation will begin January 1995. (System Engineering, NTS 2541809301605)

F. PREVIOUS EVENTS

Based upon a historical review of LERs, ComEd did not identify any other similar events with respect to a potential nonconformance with the 10 CFR 50 Appendix R Safe Shutdown Analysis separation requirements.

G. COMPONENT FAILURE DATA

None

**Licensee Event Report
Reviewer Assignment Form**

Revised 09/20/94

LER # 254/94-013

Date: October 12, 1994

Subject: Emergency Diesel Generator HVAC Relays in Nonconformance
With 10CFR50, Appendix R Requirements, Due to Inadequate Initial Development of
the Safe Shutdown Analysis.

Signatures of reviewers indicating review and approval of item:

Systems Eng. Supv:	<u><i>[Signature]</i></u>	<u>1 11/9/94</u>	<u><i>Michael J. McLeary</i></u>	<u>11/9/94</u>
		Date		Date
Operating Eng.:	<u><i>Alex L. Misch</i></u>	<u>1 11/10/94</u>	<u><i>James Mastaglio</i></u>	<u>1 11/9/94</u>
		Date		Date
Technical Supt.:	<u><i>Paul [Signature]</i></u>	<u>1 11/10/94</u>	<u> </u>	<u> </u>
		Date		Date
	<u> </u>	<u> </u>	<u> </u>	<u> </u>
		Date		Date

Approved: *[Signature]* Per Chairman 1 11-11-94
Station Manager/PORC Chairman Date