

LICENSEE EVENT REPORT (LER)

Facility Name (1) QUAD-CITIES NUCLEAR POWER STATION, UNIT ONE						Docket Number (2) 0 5 0 0 0 2 5 4			Page (3) 1 of 0 5		
Title (4) 1B Recirculation Motor Generator Field Breaker Failure to Trip - Root Cause Undetermined											
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)
09	13	87	87	0 1 8	0 1	09	11	88			0 5 0 0 0 1 1
OPERATING MODE (9) 1		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)		X 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 Robert F. Thomann, Technical Staff Engineer Ext. 2188						TELEPHONE NUMBER 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	MANUFAC-TURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	
X	A D	B K R	G O B O	Y							
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)											

On September 13, 1987, Quad Cities Unit One was in the SHUTDOWN mode at 0 percent thermal power. At 0228 hours, while attempting to shutdown the 1B Recirculation Motor Generator Set for inspection, it was found that the associated field breaker failed to trip. The trip coil was found burnt out. The armature in the closing linkage was found to be binding and had to be freed by operating personnel. NRC notification was completed at 0600 hours to satisfy the requirements of 10 CFR 50.72.

The recirculation MG Set field breakers are involved in the Anticipated Transient Without a Scram (ATWS) system and are designed to trip upon either a low low reactor water level or high reactor pressure. The cause for the breaker's failure to trip could not be determined by General Electric. Various components were replaced and the breaker has been reinstalled. A procedure revision will be completed to identify the recommended lubricant. In addition, Action Item Record 4-87-13 is initiated to investigate the suitability of application for this field breaker. This report is provided to comply with 10 CFR 50.73 (a)(2)(v)(D).

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TEXT								

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: The 1B Reactor Recirculation Motor Generator (MG) field breaker failed to trip when MG set was taken off.

A. CONDITIONS PRIOR TO EVENT:

Unit: One Event Date: September 13, 1987 Event Time: 0228
Reactor Mode: 1 Mode Name: Shutdown Power Level: 00%

This report was initiated by Deviation Report D-4-1-87-084

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 September 13, 1987, during a planned refueling outage, Quad Cities Unit One was in the SHUTDOWN mode at 0 percent power. At 0228 hours, in preparation for a Recirculation Motor Generator Set (MG set) [AD, MG] inspection, operating personnel tripped the 1B Recirculation pump [P]. When the MG set was tripped from the 901-4 panel control switch, the indicating lights showed the Recirculation MG Field Breaker [BKR] had failed to trip. An Equipment Operator (EO) was dispatched to panel 2201-24B where he found the trip coil [CL] was burnt out. The EO attempted to trip the field breaker manually, but the armature in the closing linkage was hung up, preventing the breaker from tripping. The EO then freed the armature at which time the 1B Recirculation MG Set Field Breaker tripped. NRC notification via the Emergency Notification System (ENS) was completed at 0600 hours to satisfy the requirements of 10 CFR 50.72.

C. APPARENT CAUSE OF EVENT:

This report is submitted in accordance with the requirements of the code of Federal Regulations, title 10, Part 50.73(a)(2)(v)(D) which requires the reporting of "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 intermediate cause that led to the failure of the 1B Recirculation MG Set breaker was that the armature in the closing linkage hung up which caused the trip coil to burn out.

The breaker was sent to the General Electric facilities in Hammond, Indiana where it was tested and repaired. During the testing, General Electric personnel replaced the melted trip coil and then operated the breaker. The breaker operated satisfactorily. The breaker was then placed in an environment that simulated normal conditions (90 degrees Fahrenheit) overnight. The breaker again operated satisfactorily. Because the breaker operated satisfactorily during this preliminary testing, G.E. was unable to determine the root cause of the failure.

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D SAFETY ANALYSIS OF EVENT:

The safety of the public and plant personnel was never affected during this event. The Recirculation MG set field breakers are part of the Anticipated Transient Without a Scram (ATWS) [JC] system. The ATWS system automatically trips both Recirculation MG Set field breakers and initiates the opening of six Alternate Rod Insertion (ARI) [JC] valves to insert control rods [AA] in the event of high reactor [RCT] pressure (1250 psig) or low-low reactor water level (-59 inches) signals. These actions reduce the reactor power level to mitigate the consequences of the transient. Since the reactor was shutdown at the time this event occurred, the ATWS system was not required. If, under full power operating conditions, the Recirculation Motor Generator Set field breaker had failed to trip when actuated by the ATWS system, the MG Set drive breaker [BKR] could have been manually tripped. In addition, the Recirculation MG Set drive breakers automatically trip on a low-low reactor water level signal. The ATWS ARI system was still available for manual or automatic initiation and the Standby Liquid Control System (SBLC) [BR] could have been manually initiated to shutdown the reactor.

E. CORRECTIVE ACTION:

Nuclear Work Request Q60139 was written for removing and repairing the 1B Recirculation Pump MG Set field breaker. The field breaker was then sent to General Electric's facility in Hammond, Indiana, where it was inspected and repaired. During the inspection and repair, the following items were replaced or repaired:

1. Shunt trip coil (2)
2. Secondary wiring pinched to the breaker rear frame
3. Mechanism rubber inserts
4. Moving contacts - center phase
5. Link assemblies (2)
6. Retaining Pins (6)
7. Adjustable bushings
8. Pin
9. Trip Shaft bearings
10. Cam follower
11. Cam Assembly (Left and Right)
12. Pivot (2)
13. Moving contact pivot pin (3)
14. Insulation
15. Moving contact (outside phase)
16. Spring (2)

Since the breaker operated satisfactorily during initial testing at the G.E. facility, none of the above items caused the circuit breaker failure to trip.

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General Electric replaced or repaired items listed above, assembled the breaker, set the proper clearances, lubricated, and retested the breaker. The 1B Recirculation MG Set field breaker is currently re-installed.

I.E. Information Notice 87-12 identifies that G.E. Service Information Letter 448 suggested the following:

1. Maintenance/inspection intervals of every twelve months or at each refueling outage. A complete breaker overhaul every five years is recommended to complement the annual cyclical maintenance.

Quad Cities Station inspects and tests these breakers during each refuel outage per QMS 200-32 (Recirc M/G Set Field Breaker Inspection and Test). A complete breaker overhaul is performed when deemed necessary.

2. Only specified lubricants should be used on these circuit breakers.

Quad Cities Station procedure QMS 200-32 is being revised to identify the correct lubrication to be used in these circuit breakers. Nuclear Tracking System (NTS) number 2542008708400S1 will track this revision.

3. Because of the complexity and difficulty in properly making crucial adjustments unique to these breakers, only qualified properly trained personnel should perform these maintenance activities.

Quad Cities Station sent both Unit One MG Set field breakers and a spare to a G.E. facility to perform this maintenance. Both Unit Two recirculation pump MG set field breakers are scheduled to be overhauled by G.E. during the next Unit Two refuel outage. Therefore, qualified, properly trained personnel will perform this type of maintenance.

4. For this type circuit breaker that does not have the recommended lubricant, the breaker should be cycled a few times between maintenance and inspection events whenever plant conditions allow.

As stated above, the two remaining (Unit Two recirculation pump MG Set) field breakers are to be overhauled by G.E. during the next refuel outage. The overhaul will include conversion to the recommended lubrication. Therefore QMS 200-32 will not be revised to recommend the periodic cycling of this type circuit breaker. However, in the interim, the Work Planning Department will ensure that the Unit Two MG Set field breakers do get cycled if conditions allow. This will be in effect until the next Unit Two refuel outage.

Action Item Record (AIR) was initiated to investigate the suitability of application for this circuit breaker and is still open.

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F. PREVIOUS EVENTS:

No previous License Event Reports (LER) involving the Recirculation MG Set field breakers were reported at Quad Cities Station. Four similar Nuclear Plant Reliability Data System (NPRDS) events were reported nationwide, two of which were LERs. IE Information Notice 87-12 also documents problems with this type of breaker.

G. COMPONENT FAILURE DATA

The Recirculation Motor Generator field breaker that failed was a General Electric Model AKF-2-25 breaker. Its serial number is 179A5094A-186. No other components were involved in this event.



Commonwealth Edison

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RLB-88-8

January 11, 1988

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 please find Licensee Event Report (LER) 87-018, Revision 01, 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), which requires the reporting of 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.

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

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