LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
QUAD-CITIES NUCLEAR POWER STATION, UNIT ONE	0 5 0 0 0 2 5 4	1 of 0 4

Title (4) REACTOR SCRAM WHILE SHUTDOWN - NEUTRON MONITOR SPIKED HIGH HIGH DUE TO SHORT IN CONNECTOR

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)
										0 5 0 0 0
1 1	0 9	8 7	8 7	0 2 2	0 1	0 4	2 8	8 8		0 5 0 0 0

OPERATING MODE (9)	2	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)	X 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)	___ 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
Kevin Cravens, Technical Staff Engineer Ext. 2173	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
X	I G	C O N	A 3 8 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)		Expected Submission Date (15)	Month	Day	Year
___ Yes (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

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

On November 9, 1987, Quad Cities Unit One was in the REFUEL mode with fuel being loaded into the core. At 1941 hours, Intermediate Range Monitor (IRM) 14 spiked high high, resulting in a half scram on Channel A of the Reactor Protection System (RPS). RPS Channel B already had a half scram manually inserted due to maintenance to IRMs on that RPS channel. Therefore, a full reactor scram occurred. At 2000 hours, NRC was notified via the Emergency Notification System of this event per 10CFR50.72.

The cause of this event could not be determined but could have been due to a short circuit which developed due to metal particles and dirt found in the IRM wiring connectors. The metal particles are likely a product of oxidation. Procedures will be revised to include inspection and cleaning of the connectors when the signal cable is disconnected. This report is provided per 10CFR50.73(a)(2)(iv).

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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: With a Channel B half scram inserted due to maintenance on Channel B IRMs, IRM 14 spiked high high resulting in a full reactor scram.

A. CONDITIONS PRIOR TO EVENT:

Unit: One Event Date: November 9, 1987 Event Time: 1941
Reactor Mode: 2 Mode Name: Refuel Power Level: 0%

This report was initiated by Deviation Report D-4-1-87-100

Refuel Mode(2) - In this position interlocks are established so that one control rod only may be withdrawn when flux amplifiers are set at the proper sensitivity level and the refueling crane is not over the reactor. Also, the trip from the turbine control valves, turbine stop valves, main steam isolation valves, and condenser vacuum are bypassed. If the refueling crane is over the reactor, all rods must be fully inserted and none can be withdrawn.

B. DESCRIPTION OF EVENT:

On November 9, 1987, Quad Cities Unit One was shutdown for a refuel outage. The reactor mode switch was in REFUEL and fuel was being loaded into the core. At 1941 hours, Intermediate Range Monitor (IRM) 14 [IG, DET] of the Neutron Monitoring System [IG] spiked high high, resulting in a half scram on channel A of the Reactor Protection System (RPS) [JC]. Since a half scram had already been manually inserted on channel B RPS due to maintenance in progress on IRMs in that channel, a full reactor scram automatically resulted. A deviation report was initiated and in compliance with 10CFR50.72, a four hour notification was made to the NRC at 2000 hours via the Emergency Notification System. At 0525 hours on November 10, 1987, the scram was successfully reset in order to perform daily SRM response checks. IRM 14 had exhibited no abnormal behavior since the high high spike. A full scram was subsequently manually reinserted to allow further maintenance on the IRMs.

C. APPARENT CAUSE OF EVENT:

This report is submitted to comply with 10CFR50.73(a)(2)(iv), which requires the reporting of any event that results in an automatic actuation of any Engineered Safety Feature, including the RPS.

At the time of the event, all control rods were inserted. Although fuel loading was in progress, no fuel was being loaded in the quadrant of IRM 14. In addition, all Source Range Monitors [IG, DET] (SRMs) were operable at this time and showed no similar indication which would suggest that the signal from IRM 14 was anything but a spurious spike. Since there was no work in progress which could conceivably have

caused the IRM to spike, the IRM hardware was suggested to be at fault. Nuclear Work Request Q59487 was written to troubleshoot and repair the IRM. The Instrument Maintenance Department (IMD) found some dirt and metal particles in some of the connectors [IG,CON] in the IRM chassis during their investigation. It is possible that the IRM spike was caused by a short due to the metal substance in the connector and conducive environmental conditions (the changing temperature and humidity in the control room). The metal particles found in the connector are likely a product of the oxidation of the aluminum or silver metal in the connector itself. Normal aging will cause the connectors to oxidize and metal particles to flake off.

D. SAFETY ANALYSIS OF EVENT:

Due to the status of Unit One at the time of this event, the safety consequences are minimal. The unit was in the REFUEL mode at 0 percent core thermal power with all control rods inserted. The core was approximately 70 percent reloaded. All four SRMs were operable and detector response had been verified daily as required by Technical Specification 4.10.B. Therefore, any reactivity change in the core would be monitored by the SRMs.

The IRMs are required to be operable during startup. Normally the unit would not start up with a manual half scram because of inoperable IRMs. A spurious spike by an IRM during start up would cause a half scram, but the IRM could be bypassed and the half scram reset due to the redundancy of the system. (Three out of four IRMs on each channel are required to be operable as described in Technical Specification Tables 3.1-1 and 3.1-2.) The worst case scenario of more than one IRM spiking high high would cause a scram; thus, the failure of the IRMs causes a trip in the conservative direction.

E. CORRECTIVE ACTIONS:

The IMD cleaned and reassembled all the connectors in the IRM chassis and checked the connections on the signal cable in the drywell. IRM 14 has not spiked since the completion of Nuclear Work Request Q59487 on December 6, 1987.

A routine preventive maintenance schedule has not been in place to inspect the connectors because frequent assembly and disassembly of the connectors has proven to be more detrimental to a good connection than beneficial. As stated above, the possible shorting of the connector caused the IRM to trip in the conservative direction. However, based on this event, procedures QIS 1-1, "SRM Upscale Calibration", and QIP 750 1-1, "IRM Rod Block and Scram Calibration", will be changed to require the inspection and cleaning of all accessible connectors, if necessary, on the SRM and IRM signal cables during the performance of the above procedures. These procedures were chosen because they have already in place the requirement to disconnect the signal cable. The periodic inspection and cleaning of the connectors is expected to reduce the possibility of spiking due to oxidation-induced shorts. The procedure revisions will be tracked with Nuclear Tracking System number 2542008710001.1.

F. PREVIOUS EVENTS:

Licensee Event Report 254/86-018 describes a previous similar event. This involved IRMs 15 and 18 (RPS channel B) spiking high with a half scram already present on RPS channel A due to undervoltage testing. This resulted in a full reactor scram while shutdown.

G. COMPONENT FAILURE DATA:

The connectors used in the IRM chassis for the triaxial signal cable are manufactured by Amphenol. An industry-wide search of the Nuclear Plant Reliability Data System (NPRDS) revealed three failed connectors due to dirt accumulation.

Manufacturer	Nomenclature	Model Number
Amphenol	Connector	82-816

Commonwealth Edison
Quad Cities Nuclear Power Station
22710 206 Avenue North
Cordova, Illinois 61242
Telephone 309/654-2241

RLB-88-132

April 13, 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) 87-022, Revision 01, for Quad-Cities Nuclear Power Station. This revision provides information regarding the cause of this event and the corrective actions taken.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(iv), which requires the reporting of any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

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

RLB/MSK/clr

Enclosure

cc: I. Johnson
R. Higgins
INPO Records Center
NRC Region III

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