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GGC-94-023

February 18, 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) 94-001, Revision 00, for Quad Cities Nuclear Power Plant Station.

This report is submitted in accordance with the requirements of the Code of Federal Regulations, Title 10, Part 50.73(a)(2)(iv). The licensee shall report any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature.

There are no additional commitments being made by this letter.

If there are questions or comments concerning this letter, please refer them to Nick Chrissotimos, Regulatory Performance Administrator at 309-654-2241, Ext. 3100.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD CITIES NUCLEAR POWER STATION

G. G. Campbell
Station Manager

GGC/TB/plm

Enclosure

cc: J. Schrage
T. Taylor
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)
Inadvertent Insertion Of Control Rod H-1 From Position 48 to 14 During An Instrument Maintenance Surveillance

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 1	0 2	9 4	9 4	-- 0 0 1	-- 0 0	0 2	1 8	9 4		0 5 0 0 0	
0 5 0 0 0											

OPERATING MODE (9) 4	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)										
POWER LEVEL (10) 9 7	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(c)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)							
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)							
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> Other (Specify in Abstract below and in Text)							
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)								
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)								
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(x)									

LICENSEE CONTACT FOR THIS LER (12)											
NAME Dan Brigl, Regulatory Assurance Ext. 3115						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	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
X	A A	S O L	A G I 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)						Expected Submission Date (15)	Month	Day	Year
<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)						<input checked="" type="checkbox"/> NO			

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

ABSTRACT

On 01/24/94, Unit-1 was at 97% rated core thermal power. The Instrument Maintenance Department (IMD) was performing a quarterly surveillance when a unit 1/2 scram A channel signal was purposely inserted, and caused rod drift of Control Rod Drive (CRD)(AA) H-1 from position 48 and 14.

The exact cause for the rod drift of CRD H-1 could not be determined. The most probable cause is a combination of the 118 scram pilot solenoid valve (SOL) leaking instrument air, and causing 126 scram inlet valve momentarily lifting off its seat. The Causal Factor of this event was attributed to Plant/System Operation.

Corrective actions included inserting CRD H-1 to position 00, taking Hydraulic Control Unit (HCU) 30-03 out-of-service, rebuilding the HCU scram pilot solenoid valves, and resetting the stem stroke of HCU scram inlet/outlet valves.

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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:

A. CONDITIONS PRIOR TO EVENT:

Unit: One Event Date: January 2, 1994 Event Time: 1626
 Reactor Mode: 4 Mode Name: Run Power Level: 97

This report was initiated by Licensee Report 254/94-001.

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 EVENTS:

At approximately 1623 on 01/24/94, Unit-1 was in the run mode at 97% rated core thermal power. The Instrument Maintenance Department (IMD) was performing Quarterly Scram Discharge Volume (SDV) Level Switch Functional Testing (QCIS 300-1). Per procedure a unit 1/2 scram signal was inserted on Reactor Protection System (RPS) channel A.

Approximately 15 seconds after insertion of the 1/2 scram signal alarm A-3, ROD DRIFT, annunciated on the 902-5 panel. The full core display indicated that Control Rod Drive (CRD) (AA) H-1 had drifted from position 48 to position 14.

The 1/2 scram signal was inserted, about 15 seconds later CRD motion was detected, and it took about 12 seconds to reach position 14. The 1/2 scram signal was reset at approximately 1624.

An Operator was dispatched to the CRD H-1 Hydraulic Control Unit (HCU) 30-03 to investigate. He visually checked the scram pilot solenoids (SOL) for external air leakage, and felt for increased temperature on the scram exhaust line. No abnormalities were noted.

Immediate corrective actions involved notifying the Unit supervisor, the Shift Engineer (SE) and a Qualified Nuclear Engineer (QNE). The IMD surveillance was suspended, CRD H-1 was inserted to position 00 (in accordance with instructions from a QNE), and all CRD moves were halted.

At approximately 1744, HCU 30-03 was taken out-of-service for the SE, and electrically disarmed. This action was taken to prevent CRD withdrawal prior to trouble shooting and repair completion.

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Nuclear Work Request Q14205 was initiated to trouble shoot and investigate the CRD. Problem Identification Form (PIF) 94-0153 was generated to investigate the event.

The following is a summary of conclusions and Causal Factors (C/F) relating to problems which may have influenced and/or contributed to equipment malfunctions.

C. CAUSE OF THE EVENT:

This report is submitted in accordance with 10CFR50.73(a)(2)(iv), which requires the reporting of any unplanned Engineering safety Feature (ESF) actuation.

Working with the General Electric (GE) Site Engineer, the System Engineer and Investigator reproduced the event to observe operation of the pilot solenoid valves. The CRD drifting, points to 4 potential causes: (1) high drive header pressure and/or HCU Directional Control Valves malfunction, (2) high cooling water header pressure, (3) leaking or faulty scram valves (126 and 127), or (4) pilot air problems including scram pilot valves (117 and 118).

C/F: Plant/System Operation

The unplanned insertion of CRD H-1 was possibly due to a pressure transient caused by instrument air leakage past the exhaust port pressure diaphragm of scram pilot solenoid valve 118. During trouble shooting activities, air was observed continuously leaking from the 118 valve exhaust port upon insertion of a channel B RPS scram signal. No instrument air should have been exhausted, and should have remained isolated by the channel A scram solenoid valve.

The 118 scram pilot solenoid valve's exhaust diaphragm was found to have a defect on the seating surface associated with the exhaust port. The defective diaphragm could have allowed a small amount of instrument air pressure to bleed off when a 1/2 scram signal was initially applied to channel A.

During trouble shooting activities, the MMD adjusted the stroke pressure on the 126 and 127 valves. During the inspection, MMD found that the 126 valve had to have its stroke adjusted to seat tighter.

The seating adjustment was difficult to measure, and did not effect limit switches used for Control Room indication.

D. SAFETY ANALYSIS:

The safety significance with having CRD H-1 inadvertently inserted from position 48 to 14 is considered minimal. The CRD is a peripheral rod, that had negligible effect on the Unit-1 flux profile.

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Due to the nature of this event, there were no power or thermal hydraulic limit changes when the CRD drifted from position 48 to 14. The insertion (position 00 is full insertion) of the CRD did not cross any other rod tips, since all rods around it were fully withdrawn (position 48).

The insertion of CRD H-1 was in the conservative direction, providing negative reactivity to the reactor core, and would not effect scram functions. Since this type of failure does not effect scram functions of the CRD, there was no shutdown margin concern with this event.

E. CORRECTIVE ACTIONS:

The immediate corrective action involved the Operations Department sending an Operator to visually inspect HCU 30-03. The Operator looked for flow in the scram valve piping, and leaks from the scram pilot solenoid valves. The fuse holders for HCU 30-03 scram pilot solenoid valves were also inspected. No abnormalities were noted.

Additionally, the Operations Department tried to simulate the 1/2 scram signal on RPS channel A by pulling the fuse for the HCU 30-03 117 valve. The rod did not drift or move from its fully withdrawn position.

CRD H-1 was fully inserted to position 00, and taken out of service on the Rod Worth Minimizer (RWM). The HCU 30-03 was electrically disarmed for trouble shooting activities, and to prevent withdrawal of the CRD.

The HCU 30-03 scram valves 126 and 127 had the stem stroke adjusted, to ensure the valves were seated properly, under NWR Q14205. The scram pilot solenoid valves were rebuilt with like parts under NWR Q12855.

Review of maintenance history, and vender recommended preventive maintenance (PM) activities, this type of event has not trended adversely. The PM programs for the scram pilot solenoid valves, and the scram inlet/outlet valves, are deemed adequate with no further corrective actions necessary.

F. PREVIOUS OCCURRENCE:

A Nuclear Plant Reliability Data System (NPRDS) search was performed indicating that Quad Cities station has had 3 incidents involving a CRD drift associated with scram pilot solenoid, or scram valve failures.

A nationwide search of the NPRDS data base indicated that 20 events exist involving CRD drifting associated with scram pilot or scram valve failure. Of the 20 failures, 12 involved scram pilot solenoid valves, 5 involved scram inlet/outlet valves, and 3 involved other equipment.

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In all cases involving the scram inlet/outlet valves and scram pilot valves, the corrective actions were to adjust the scram valve stroke or replace valve diaphragms.

After review of the Nuclear Tracking System data base, there were no LER's which involved control rod drift at Quad Cities Station.

G. COMPONENT FAILURE DATA:

There was no component failure associated with the 126, and 127 scram inlet/outlet valves.

The scram pilot solenoid valves are manufactured by the Automatic Switch Company (ASCo) with manufacturer part number HVA90-405-2J.

The rebuild kits for the ASCo valves are manufacturer part number 204-137.