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) Safety Feature Actuation Caused by Possible Relay Coil Installation Error

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)
									QUAD CITIES UNIT TWO	0 5 0 0 0 2 6 5
1 0	0 6	8 7	8 7	0 2 0	0 0	1 1	0 3	8 7		0 5 0 0 0

OPERATING MODE (9)	1
POWER LEVEL (10)	0 0 0

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)

___ 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
Dennis Dolecheck, Technical Staff Engineer Ext. 2190	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
B	I L	R L Y	G 0 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 October 6, 1987, Quad Cities Unit One was in the SHUTDOWN mode with the reactor defueled. At 1303 hours, an Engineered Safety Feature (ESF) actuation occurred from the Refuel Floor Radiation Monitor System; the control room ventilation switched to 100 percent recirculation, Unit One and Two Reactor Building Ventilation automatically isolated, and a Standby Gas Treatment train automatically started. NRC notification per 10 CFR 50.72 was completed at 1608 hours via the Emergency Notification System (ENS).

The cause for this event was determined to be the result of an installation deficiency that was not identified and corrected during post maintenance testing. The coil in relay 1-1705-106 (1A Refuel Floor Radiation Monitor Downscale Relay) had been replaced on October 1, 1987, and it appears that the relay was damaged (bent coil tab) during the coil replacement. This caused contact misalignment and the ESF actuation on October 6, 1987. Corrective action includes: 1. discussion with all Electrical Maintenance personnel regarding this event; 2. completion of modification M-4-1(2)-85-17 to replace this type of relay in 901(2)-40 and 41 panels; and 3. development of an effective post maintenance testing and documentation program. This report is provided to comply with 10 CFR 50.73 (a)(2)(iv).

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: A Safety Feature actuation occurred due to possible installation error during relay coil replacement.

A. CONDITIONS PRIOR TO EVENT:

Unit: One | Event Date: October 6, 1987 | Event Time: 1303
Reactor Mode: 1 | Mode Name: SHUTDOWN | Power Level: 00%

This report was initiated by Deviation Report D-4-1-87-092

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 October 6, 1987, Quad Cities Unit One was in the SHUTDOWN mode with the reactor defueled. At 1303 hours, the Reactor Building Ventilation (RBV) system [VA] isolated and a Standby Gas Treatment (SBGT) Train [BH] automatically started. In addition, the control room ventilation system [VI] went into the 100 percent recirculation mode. This event is an Engineered Safety Feature (ESF) [JE] actuation. When this occurred, the Instrument Maintenance (IM) Department personnel were in the process of removing the power supply [JX] to the 1B Refuel Floor Radiation Monitor [RE] for replacement. This caused a downscale signal and alarm for the B channel radiation monitor. However a single downscale signal should not have caused the ESF actuation.

An investigation conducted to determine the reason for this event discovered that the 1A Fuel Pool Radiation Monitor downscale relay (1-1705-106) [RLY] contacts located in the 901-40 panel [PL] were not making up properly. This relay is normally in the energized position and deenergizes when a downscale condition occurs. Relay contacts 5-6 were found to be in the deenergized (open) position although the relay was energized. These contacts provided a 1A Fuel Pool Radiation Monitor downscale signal to the ventilation trip logic. Contacts 1-2, which actuate the control room downscale alarm for the 1A monitor, were in the normal energized (open) state. As a result, an invalid downscale signal was provided to the ventilation trip logic with no indication (alarm) of a downscale condition. When the 1B Fuel Pool Radiation Monitor power supply was removed causing a second downscale signal, the ESF actuation occurred as per the logic design.

Nuclear Work Request Q60791 was initiated to repair or replaced the 1-1705-106 relay. The NRC was notified of this event via the Emergency Notification System (ENS) at 1608 hours on October 6, 1987, to satisfy the requirements of 10 CFR 50.72. At 2148 hours, the 1-1705-106 relay was replaced and functional testing was performed to verify proper operation of this relay.

C. APPARENT CAUSE OF EVENT:

This report is supplied to comply with the requirements of 10 CFR 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 (ESF).

The apparent cause of this event was attributed to a probable installation deficiency. Relay coil 1-1705-106 had been replaced previously (on October 1, 1987) because the relay coil was found shorted, causing a downscale trip failure at the monitor. The coil was replaced (documented on Nuclear Work Request (WR) Q60678) and the test performed after maintenance was to verify the downscale alarm was cleared. However, the relay coil tab which actuates the contacts was apparently bent during the coil installation. This resulted in misaligned relay contacts causing the downscale alarm to clear with the downscale signal still present. This condition was not discovered and corrected during the test that was performed following the coil replacement.

D. SAFETY ANALYSIS OF EVENT:

The safety of the public and plant was never affected during this event. The relay failure did not affect the ability of the system to perform its function in the event of a high radiation signal. The failure of the relay was in a conservative direction.

E. CORRECTIVE ACTIONS:

The immediate corrective action was to replace the relay per WR Q60791. The relay was replaced like for like following satisfactory bench testing. Functional testing of the installed relay was completed at 2148 hours. Modification M4-1(2)-85-17 has already been initiated to replace all CR120A model relays in the 901(2)-40 and 41 panels with a suitable replacement to improve reliability. It is expected that events of a similar nature will be prevented upon completion of modification.

The importance of insuring that care is taken when routine maintenance such as this is performed was discussed with Electrical Maintenance personnel. This event was discussed and the actual defective relay was used to describe the problem that was created when the tab was bent during coil replacement. It was stressed that care must be exercised when performing even seemingly routine maintenance. Insuring adequate post maintenance testing is performed was also stressed during this discussion.

Post maintenance testing adequacy is an issue that is currently being addressed by the Station. A program for post-maintenance testing is being developed to improve post-maintenance testing and documentation. The program is expected to be written and implemented by February, 1988. This program is being developed based on a recommendation by the Institute of Nuclear Power Operations (INPO).

F. PREVIOUS EVENTS:

A review of previous events identified the following:

Licensee Event Reports	Description
1. 254/85-013	Relay coil failures caused SBGTS to
2. 254/83-10/03L	autostart and Reactor Building and
3. 254/83-15/03L	Control Room Ventilation Systems to isolate.
4. 254/87-012	

A Nuclear Plant Reliability Data System (NPRDS) search was performed. This search indicates that nationwide there have been nine documented failures of this model relay.

G. COMPONENT FAILURE DATA:

Manufacturer	General Electric
Nomenclature	Relay
Model #	CR120A
Part #	CR120A04002AA

Commonwealth Edison

DEVIATION REPORT

DVR NO. 4 (STA) - 1 (UNIT) - 87 (YEAR) - 092 (NO.)

PART 1 TITLE OF DEVIATION

ESF ACTUATION

OCCURRED: 10/6/87 (DATE) 1303 (TIME)

SYSTEM AFFECTED: 1700

PLANT STATUS AT TIME OF EVENT: MODE SHUTDOWN, POWER(%) -0-

WORK REQUEST NO.:

TESTING: ☐ YES ☒ NO

DESCRIPTION OF EVENT

AT 1303 CR VENTS ISOLATED, RX BLDG. VENTS ISOLATED, SBGTS INITIATED. THE POWER SUPPLY FOR THE "B" RX BLDG. AND FUEL POOL RAD MONITORS WAS REMOVED FOR REPLACEMENT CAUSING A DOWNSCALE TRIP ON THE "B" RAD MONITORS. THIS ALONE WOULD NOT CAUSE THE TRIP, HOWEVER, AN "A" FUEL POOL RAD MONITOR DOWNSCALE RELAY (1705-106) WAS FOUND TO BE DEFECTIVE. THE RELAY WAS ENERGIZED BUT THE MECHANISM WAS JAMMED AND THE "A" CONTACTS (TRIP CONTACTS) DID NOT MAKE UP. THE "B" CONTACT (ALARM CONTACT) WORKED. THERE WAS NO DOWNSCALE ALARM ON 901-3 FOR THE "A" MONITOR. THE 1705-106 RELAY COIL BURNED UP ON OCT. 1 AND THE COIL HAD BEEN REPLACED.

POTENTIALLY SIGNIFICANT EVENT PER NSD DIRECTIVE A-07 ☐ YES ☒ NO

10CFR50.72 NRC RED PHONE NOTIFICATION MADE ☐ 1 HOUR ☒ 4 HOUR 1608 (TIME) ☐ NO

J. GUEST (RESPONSIBLE SUPERVISOR) 10/6/87 (DATE)

PART 2 OPERATING ENGINEER'S COMMENTS

RELAY WAS FAILED IN THE TRIPPED CONDITION CAUSING THE ESF ACTUATION. THE HIGH TRIP FOR THIS RAD MONITOR WAS STILL FUNCTIONAL.

☐ NON REPORTABLE EVENT

☒ 30 DAY REPORTABLE/10CFR 50.73 (a)(2)(iv)

☐ 5 DAY REPORT PER 10CFR21

☐ ANNUAL/SPECIAL REPORT REQUIRED

A.I.R. #

L.E.R. # 87-020

NOTIFICATION: REGION III — DATE — TIME

NSD — DATE — TIME

☐ CECO CORPORATE NOTIFICATION MADE IF ABOVE NOTIFICATION IS PER 10CFR21

TELECOPY: CECO CORPORATE OFFICER — DATE — TIME

PRELIMINARY REPORT COMPLETED AND REVIEWED: J. SWALES (OPERATING ENGINEER) 10/7/87 (DATE)

INVESTIGATION REPORT & RESOLUTION ACCEPTED BY STATION REVIEW

RESOLUTION APPROVED AND AUTHORIZED FOR DISTRIBUTION

STATION MANAGER — 11-7-87 (DATE)

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

RLB-87-305

November 3, 1987

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) 87-020, 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)(iv), which requires reporting of any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature.

Respectfully,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

R. L. Bax
Station Manager

RLB/MSK/dak

Enclosure

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

1092H

IE22
1/1