



Commonwealth Edison

Zion Generating Station
Shiloh Blvd. & Lake Michigan
Zion, Illinois 60099
Telephone 708 / 746-2084

October 15, 1990

U.S. Nuclear Regulatory Commission
Document Control Clerk
Washington, D. C. 20555

Dear Sir:

The enclosed Licensee Event Report number 90-020-00, Docket No. 50-295/DPR-39 from Zion Generating Station is being transmitted to you in accordance with the requirements of 10CFR50.73(a)(2)(iv), which requires a 30 day written report when any operation or condition occurs that results in manual or automatic actuation of any Engineered Safety Feature.

Very truly yours,

W. R. Kurch
for T. P. Joyce
Station Manager
Zion Generating Station

TPJ/PG/td

Enclosure: Licensee Event Report

cc: NRC Region III Administrator
NRC Resident Inspector
INPO Record Center
CECo Distribution List

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PDR ADOCK 05000295
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LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Zion Unit 1	Docket Number (2) 0 5 0 0 0 2 9 5	Page (3) 1 of 0 4
Title (4) Inadvertent Autostart of 1A AFW Pump		

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	9	1	5	9	0	9	0	0	0	2	0	0	1	0	1	5	9	0	N/A	

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 9 4	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 73.71(c)	<input type="checkbox"/> Other (Specify in Abstract below and in Text)

LICENSEE CONTACT FOR THIS LER (12)

Name Bob Soden, Technical Staff Engineer	ext. 2322	TELEPHONE NUMBER AREA CODE 7 0 8 7 4 6 - 2 0 8 4
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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	J G	R L Y	W 1 2 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15)	Month	Day	Year
<input checked="" type="checkbox"/> 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 15, 1990 at 1226, while performing Periodic Test(PT) 5B, "Reactor Protection Logic Reactor at Normal Operation Conditions", Section 4 of the test failed. Section 4 tests the Train A 2/4 Reactor Coolant Pump (RCP) Bus Undervoltage Reactor Trip Logic by de-energizing logic relays to simulate RCP Bus undervoltage. Troubleshooting efforts identified that the Bus 144 undervoltage logic relay, 27-2/XA, was defective. During the replacement of the relay, 1A Auxiliary Feedwater(AFW) pump started automatically. De-termination of the relay contacts opened the normally energized 2/4 logic circuit which autostarted the AFW pump. Following relay replacement, the "RCP Bus UV Rx Trip" annunciator did not actuate as required during testing due to a wiring error on relay 27-2/XA. The wiring discrepancy was corrected and section 4 of the test completed satisfactorily.

There was minimal effect on plant safety since Train B of Reactor Protection was always available.

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

A. CONDITION PRIOR TO EVENT

MODE 1 - Power RX Power 94 RCS [AB] Temperature/ Pressure 558°F/2235 psig

B. DESCRIPTION OF EVENT

On September 15, 1990 at 1226, while performing Periodic Test (PT) 5B, "Reactor Protection Logic Reactor at Normal Operation Conditions", Section 4 of the test failed. Section 4 tests the Train A 2/4 Reactor Coolant Pump (RCP) Bus Undervoltage Reactor Trip Logic by de-energizing logic relays to simulate RCP Bus undervoltage. When the undervoltage logic relay for Bus 144 was de-energized in conjunction with another logic relay, only one of the expected actuations occurred. Troubleshooting efforts identified that not all of the contacts of the Bus 144 undervoltage logic relay, 27-2/XA, were making up properly. A work request (WR# 95347) was written to replace the relay.

During the replacement of the relay, 1A Auxiliary Feedwater (AFW) pump started automatically. A review of the wiring diagrams and wiring schematics identified that de-termination of the relay contacts opened the normally energized 2/4 logic circuit, thus de-energizing the actuation relay which autostarted the AFW pump.

Replacement of relay 27-2/XA was completed per E005-1, "Repair or Replacement of Logic Relays" and the test section repeated. During certain test sections, the "RCP Bus UV Rx Trip" annunciator did not actuate as required. These failed test sections all involved relay 27-2/XA which had previously been replaced. Based on the wiring diagrams and schematics, the problem was traced to a specific contact on the relay. A visual inspection of the contact determined that the particular contact had been incorrectly wired during replacement. The wiring discrepancy was corrected and section 4 of the test completed satisfactorily.

C. APPARENT CAUSE OF EVENT

The cause of the initial failure of relay 27-2/XA was component failure. It was noted during the troubleshooting efforts that the plunger on the relay was not pulled in although voltage was applied to the coil. When the plunger was lightly touched, the relay picked up. The relay was tested on the bench but the failure could not be repeated. The relay was disassembled but no cause for the failure could be determined.

The cause of the autostart of 1A AFW pump was personnel error, due to an inadequate review of the design documents to determine the effect of de-terminating the relay from the circuit. A review of the circuit schematic was performed by the Technical Staff Engineer prior to relay replacement. The schematic indicated that, with the relay contacts de-terminated from the circuit, a path still existed to energize the actuation relay through the 2/4 logic circuit. However, because of the way the relay contacts are wired, lifting the wires off the relay contacts broke the circuit path completely. This potential for autostart of the 1A AFW should have been identified during the initial review of the circuit, by reviewing the wiring diagram in conjunction with the schematic diagram.

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C. APPARENT CAUSE OF EVENT (con't)

The cause of the relay contact wiring error was procedural deficiency. The electrician who replaced the relay followed procedure E005-1 which requires verification that all wires are labelled prior to replacement. Although the wires in the reactor protection system are labelled, they are labelled to indicate a particular electrically common point (which has multiple termination points) in the circuit, not a specific wire. Therefore, more than one wire can have the same label designation. In this case, there were 4 wires with the same label on 2 adjacent terminal points. Precautions were not taken to insure that wires were re-terminated on the correct terminal points. The result was that two of the wires were installed on the wrong points. A contributing factor was that wiring drawings were not included in the work package for the electrician to refer to during replacement.

D. SAFETY ANALYSIS OF EVENT

Failure of this relay had minimal effect on the safe operation of the plant. Other than annunciators and status lights, relay 27-2/XA provides only two actuation functions. Both of these functions are part of 2/4 logics. One is the start of the 1A AFW pump and the other is a reactor trip.

The relay failure affected only Train A of Reactor Protection. Train B was still available to provide redundant actuation. A reactor trip from a loss of 2 of the RCP Busses would still have occurred from Train A due to loss of the RCP's on bus undervoltage. Other automatic reactor trips and 1A AFW pump autostarts were unaffected by this failure.

This relay is tested monthly for proper operation. Therefore, any failures of this relay would be readily detected.

There was no effect on plant safety due to the 1A AFW pump autostarting. This placed the pump in the actuated condition and operability of the pump was maintained.

Since Train A reactor protection was in test and the Train A reactor trip breakers were already tripped, unwiring the relay had no effect on the reactor trip portion of the circuit. However, if the Train A reactor trip breaker had been closed with it's associated bypass breaker open, a reactor trip from the unwired 2/4 logic circuit would have occurred.

The wiring discrepancy found on the relay only affected a particular annunciator. There was no effect on the reactor trip or AFW autostart circuits.

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E. CORRECTIVE ACTIONS

A new relay 27-2/XA was installed and the test section completed satisfactorily. Based on the frequency of testing of this relay, no further corrective action is planned at this time.

The autostart of the AFW pump will be discussed with Technical Staff Electrical Group to stress the importance of determining the effects of removing wires or installing jumpers in circuits prior to the start of the work. Additionally, Electrical Group will evaluate other methods to prevent recurrence, such as additional training and/or troubleshooting guides (245-180-90-12701).

E005-1 will be changed to provide additional instructions to address those relays with multiple wires on termination points. The procedure will also require that, for replacement of Reactor Protection relays, wiring drawings be used during reinstallation to verify correct wire termination (295-180-90-12702).

This event will be covered in a tailgate session with the Electrical Maintenance Department (295-180-90-12703).

F. PREVIOUS EVENTS

A review of the Zion Station Discrepancy Reports data base did not identify any previous failures of relays of this type. A NPRDS search revealed no relevant information.

There have been previous occurrences of inadvertent component actuations due to personnel error during troubleshooting or repair of Reactor Protection and Engineered Safeguards Systems. The most recent of these are documented in Licensee Event Report Nos. 90-07 and 90-08 (Unit 2). There have also been previous occurrences of wiring errors during maintenance activities. The most recent occurrence involved a jumper left in place after maintenance was completed. This event is documented in Zion Station Deviation Report 22-1-89-077. The corrective actions taken were not applicable to this event.

G. COMPONENT FAILURE DATA

<u>MANUFACTURER</u>	<u>NOMENCLATURE</u>	<u>MODEL NUMBER</u>	<u>MFG PART NUMBER</u>
Westinghouse	Relay,Control	NBFD 48S	5072A49G14