Entergy

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J. F. Alexander
Director
Nuclear Assessment

10 CFR 50.73

February 28, 2001
ENGC Ltr. 2.01.006

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Docket No. 50-293
License No. DPR-35

Dear Sir:

The enclosed Licensee Event Report (LER) 2001-001-00, "Swing Bus B6 Potentially Inoperable Under Certain Conditions Due To Installation Of Incorrect Relays" is submitted in accordance with 10 CFR 50.73.

Please do not hesitate to contact me if there are any questions regarding this report.

Sincerely,

J. F. Alexander

JRH/
Enclosure: LER 2001-001-00

cc: Mr. Hubert J. Miller
Regional Administrator, Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Sr. NRC Resident Inspector
Pilgrim Nuclear Power Station

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NRC Form 366 (6-1998) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

(See reverse for number of digits/characters for each block)

APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001

Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the Records Management Branch (T-6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, and to the Paperwork Reduction Project (3150-0104), Office of Management and Budget, Washington, DC 20503. If an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

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TITLE (4)

Swing Bus B6 Potentially Inoperable Under Certain Conditions Due To Installation Of Incorrect Relays

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 NAME	DOCKET NUMBER
									N/A	05000
01	02	2001	2001	001	00	02	28	2001	FACILITY NAME: N/A	DOCKET NUMBER: 05000

OPERATING MODE (9)	N
POWER LEVEL (10)	100

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

	20.2201 (b)		20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(viii)
	22.2203(a)(1)		20.2203(a)(3)(i)	X 50.73(a)(2)(ii)(B)	50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)	50.73(a)(2)(iii)	73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)	50.73(a)(2)(iv)	OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)	50.73(a)(2)(v)(D)	Specify in Abstract below
	20.2203(a)(2)(iv)		50.36(c)(2)	50.73(a)(2)(vii)	or in NRC Form 366A

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
James R. Haley - Senior Engineer	(508) 830-8143

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

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 15 single-spaced typewritten lines) (16)

Two incorrectly configured relays were installed during the 1999 refueling outage (RFO 12) in the B6 480 VAC bus transfer scheme as part of the Pilgrim Station seismic upgrade program. These relays would have prevented swing bus B6 from transferring to the alternate supply under certain design basis conditions. The inability of B6 to transfer would have prevented the low pressure coolant injection isolation valves from opening to perform their safety function.

The cause for installation of the nonconforming relays was failure to detect the mismatch between the relay label and contact configuration by the manufacturer and by a commercial dedication organization during the qualification process. Corrective actions restored the design basis requirements for the B6 transfer scheme.

This report meets the reporting requirements of 10 CFR 21 for nonconforming materials installed in safety-related applications.

This event occurred at 100 percent reactor power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was about 1035 psig with the water temperature at the saturation temperature for that pressure. This event posed no threat to public health and safety.

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TEXT (If more space is required, use additional copies of NRC Form 366A) **(17)**

BACKGROUND

Emergency AC power is provided to the Pilgrim Station Auxiliary Power Distribution System through the safety-related 4160 VAC buses A5 and A6. The startup transformer (SUT) is designed to supply these buses if the preferred offsite power (345 kV) is available. Should preferred offsite power be lost or become seriously degraded, two emergency diesel generators (EDG) are designed to provide onsite power to their respective buses.

The core spray (CS) and residual heat removal (RHR) systems are part of the Core Standby Cooling Systems (CSCS) used to mitigate design basis accidents and are powered by the emergency AC system. Bus A5 supplies 4160 VAC to CS pump A and RHR pumps A and C. Bus A6 supplies 4160 VAC to CS pump B and RHR pumps B and D. Buses A5 and A6 also supply 480 VAC power to safety-related buses B1 and B2. Safety-related 480 VAC swing bus B6 is designed to be powered by A5 or A6. The CS train A injection valves are powered from 480 VAC Motor Control Center (MCC) B17 which is powered by bus B1. The CS train B injection valves are powered from 480 VAC MCC B18, which is powered by bus B2. The RHR/low pressure coolant injection (LPCI) valves are powered from MCC B20, which is powered by bus B6.

Bus B6 is a swing type bus that can be powered by bus B1 or B2. Bus B1 is the normal power source for bus B6 with B1/B6 supply breakers 52-102 and 52-601 in the CLOSED position and bus B2/B6 supply breakers 52-202 and 52-602 in the OPEN position. The normal and alternate supply breakers are interlocked to prevent B6 from being simultaneously powered by bus B1 and B2.

Control power for the B6 transfer scheme, and B1/B6 and B2/B6 supply breakers is provided by the 125 VDC swing bus D6 that is powered from bus D16 or bus D17 through automatic transfer switches Y-10, D32 and D33. This configuration makes the control power for the circuit breakers highly reliable and independent of the 480 VAC buses.

If bus B1 were to experience a loss of voltage, the design provides an automatic transfer of B6 from B1 to B2 to ensure continuous power to B6. Moreover, if a loss of offsite power were to occur, buses B1 and B2 would both de-energize and the B6 supply breakers that are closed would open. The B6 transfer scheme is self-seeking; meaning that the B1/B6 or B2/B6 supply breakers would close, depending upon which bus (B1 or B2) re-energizes first with a 2-second preference for B1.

As part of the Pilgrim Station Unresolved Safety Issue (USI) A-46 seismic upgrade program, undervoltage relays (GE type HFA) in the B6 transfer scheme (relay 27-B2Z2 in bus B2 and relay 27-B2X2 in bus B6) were replaced with Joslyn Clark relays qualified and dedicated by Trentec Corporation, an Appendix B supplier. These relays were installed and tested under Plant Design Change (PDC) 98-23 during the 1999 refueling outage (RFO-12). As part of the procurement for PDC 98-23, Trentec dedication testing was performed on one of five relays. After the dedication program at Trentec, a pre-installation bench test was performed at Pilgrim Station to verify time-delay operation, and an integrated post work automatic transfer test was performed. The post work test used existing procedure 3.M.3-27, "480 VAC BUS B6 AUTOMATIC TRANSFER TEST" and successfully demonstrated the transfer of bus B6 from B1 to B2 and B2 to B1.

The maintenance requests associated with PDC 98-23 were closed out in June 1999 with no discrepancies identified. Acceptable Trentec qualification data had been received, including seismic qualification.

EVENT DESCRIPTION

The B6 transfer scheme uses 125 VDC control power from DC transfer bus D6 via switch Y-10. The SE relay in transfer switch Y-10 had experienced degraded performance and increased surveillance testing had been instituted. The degrading condition of the SE relay was reported in problem reports, most recently in PR00.9497 and in LER 2000-003-00, "125V DC Swing Bus Automatic Transfer Switch Degraded Performance." A decision was made to replace the SE relay in transfer switch Y-10 with two qualified relays available in the Pilgrim Station warehouse. On December 22, 2000, while physically inspecting one of the relays withdrawn from the warehouse to be installed as part of temporary modification TM 00-053 to replace the degraded SE relay, it was observed that the time-delayed contact configuration of the relay was not as ordered from the supplier (Trentec). The relay examined had two instantaneous contacts and two time-delayed contacts (corresponding to Joslyn Clark part number (P/N) X714UPDA-125) rather than four time-delayed contacts as indicated on the label (Joslyn Clark P/N X714UPDE-125) and required by the purchase specifications. It was concluded that the relays without time delay contacts could be used in the proposed application.

Trentec, the commercial dedication vendor, obtained 5 relays, P/N X714UPDE, from Joslyn Clark. One of the five was used for seismic testing and the remaining four were dedicated and furnished to Pilgrim Station. A review of plant design change (PDC) 98-23 was initiated to identify where the other two relays with the same part number were installed. This review concluded that two relays had been installed in the B2/B6 transfer scheme during RFO-12 as part of a seismic upgrade. On January 2, 2001, an inspection was made of the two installed relays, one in the B2 cabinet located in the switchgear room and one in the B6 cabinet located in the cable spreading room. The physical location of the two relays in their respective cabinets made immediate recognition of the contact configuration difficult. Observations and photographs were communicated with both Trentec and Joslyn Clark, to determine if a configuration discrepancy existed.

After being made aware of the discrepancy, Trentec inspected the relay that had been used for and retained after qualification testing and determined it to be correctly labeled and configured with 4 time-delayed contacts. When the nonconformance was verified, PR01.9004 was written to document the condition. Due to uncertainties of the potential impact of the incorrect configuration, B2/B6 was disabled and a Technical Specification limiting condition for operation (LCO A01-005) was entered, taking low pressure coolant injection (LPCI) out of service.

A detailed evaluation was initiated to determine the impact of the two instantaneous relay contacts on the B2/B6 transfer scheme and its ability to maintain 480 VAC power to B6. The review concluded that if B2 remains energized, an automatic transfer of bus B6 to bus B2 would occur if bus B1 were to become de-energized. If a loss of offsite power occurred and B1 re-energized

first, B6 would energize from B1. If, however, B2 re-energized more than 2 seconds before B1, the B2/B6 transfer breakers would not close and bus B6 would not automatically re-energize as designed.

The NRC Operations Center was notified in accordance with 10 CFR 50.72(b)(1)(ii)(B), at 1737 hours on January 11, 2001, due to the belief that a condition was identified to be potentially outside the design basis.

This event occurred at 100 percent reactor power with the reactor mode selector switch in the RUN position. The reactor vessel pressure was about 1035 psig with the water temperature at the saturation temperature for that pressure.

CAUSE

The root cause for installation of two nonconforming Joslyn Clark relays under PDC 98-23 is the failure to detect the mismatch between the relay label and contact configuration by Trentec during commercial dedication activities under Purchase Order #STR 144343. Missed opportunities to have identified this discrepancy include PNPS receipt inspection, pre-installation calibration and bench testing, and post work testing at Pilgrim. The relay nonconformances were not identified at any of these steps. A detailed root cause was completed as part of PR01.9004.

EXTENT OF THE PROBLEM

An extent review was performed to determine whether similar relays had been installed in other safety-related applications. It was concluded that Pilgrim Station received four incorrectly labeled relays. Two were installed in the B2/B6 transfer scheme as part of PDC 98-23. The remaining two were installed as part of temporary modification TM 00-053 on December 23, 2000 after concluding the acceptability of using the two instantaneous contacts. Trentec also supplied Square D relays under the same purchase order. An evaluation concluded that the Square D parts supplied by Trentec were configured as specified.

CORRECTIVE ACTION

Corrective actions taken include the following:

Relay modification kits were obtained from the vendor and time-delayed operating links were installed on both relays in the B2/B6 transfer scheme. These modifications were made in accordance with FRN 98-23-03 and post work testing was initiated in accordance with temporary procedure TP 01-001. The bench testing initially failed on relay 27-B2Z2 due to misalignment in the relay timing head. A nonconformance report (NCR 00-032) was issued and a modification was made in accordance with FRN 98-23-04 and the relay performed correctly. The installation and testing of both relays were completed and the LPCI LCO was exited at 7:45AM on January 7, 2001, within the allowed out of service time. The installation and post work testing of the two relays restored the B6 transfer scheme to its design basis.

Entergy Corporate Quality Assurance has issued a corrective action program document (CAR 01-005) request to Trentec to identify the cause of the failure to

identify the mismatch between the relay label and contact configuration, their corrective actions and their completion schedule. In addition, an extent review was requested of Trentec on previous purchase orders.

ACTION TO PREVENT RECURRENCE

Actions to prevent recurrence include an assessment of the effectiveness of: Trentec's corrective actions as they relate to future procurement activities; Pilgrim's receipt inspection; pre-installation calibration; bench testing; and post work testing to identify and implement necessary improvements. These actions are being tracked under the Pilgrim Station corrective action program (PR01.9004).

SAFETY CONSEQUENCES

The event posed no threat to public health and safety.

The core standby cooling system (CSCS) consists of the HPCI system, Automatic Depressurization system (ADS), Core Spray (CS) system, and the Residual Heat Removal (RHR) system in the low-pressure coolant injection (LPCI) mode.

The CS and LPCI systems function independently to provide low pressure core cooling. Of the electrical loads powered by B6, the most critical loads are the control power for the LPCI injection valves MO-1001-28A/29A and MO-1001-28B/29B. The CS system consists of two 100% capacity trains for low-pressure core cooling. The CS system, in conjunction with LPCI function, results in a total of three low-pressure core cooling trains, of which only two are necessary for low-pressure core cooling.

The CS pumps are powered from 4160 VAC bus A5 (train A) and 4160 VAC bus A6 (train B), the CS control system is powered from 125V DC A (train A) and B (train B), the CS valves are powered from 480 VAC Bus B1 (train A) and B2 (train B). The nonconforming relays installed in the B6 transfer scheme could result in failure of B6 to be automatically re-energized only if there was a loss-of-offsite power and B2 was restored more than 2 seconds faster than B1. In this unlikely event, the relays connecting B2 to B6 would lock out and transfer would not occur. During the time that the incorrect relays were installed, Pilgrim Station did not experience a loss of offsite power and therefore the potential loss of both B1 and B2 was not experienced.

REPORTABILITY

This report is submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B) (10CFR50.73 rule prior to January 23, 2001) because the modification made during RFO-12 installed two relays that had nonconforming instantaneous contacts. This condition could have prevented the design basis B1/B2 transfer for B6 under conditions of a LOOP/LOCA, loss of B1 and restoration of B2 power more than 2 seconds faster than B1.

This report also satisfies the requirements to submit a report in accordance with 10 CFR 21 for nonconforming material received from a qualified supplier and installed in safety-related applications.

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SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) issued since 1995. The review identified the following reports involving B6. LER 99-007-00, "Bus B6 Voltage Restoration Not Consistent with Safety Analysis Assumptions," and LER 00-003-00, "125V DC Swing Bus Automatic Transfer Switch Degraded Performance."

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS	CODES
Automatic Transfer Switch	83
Relay	83
SYSTEMS	
Low Pressure Coolant Injection (LPCI) system	BO
Low Voltage Power System-Class 1E	ED