NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Pilgrim Nuclear Power Station	0 5 0 0 0 2 9 3	1 OF 0 5

TITLE (4)
Full Scram Trip Signal During Surveillance and Resulting Incomplete Automatic Actuations

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)
									N/A	0 5 0 0 0
0 1	1 7	8 8	8 8	— 0 0 2	— 0 0	0 2	1 6	8 8	N/A	0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 1 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)	X 50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		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
Douglas W. Ellis, Compliance Management Engineer	6 1 7 — 7 4 7 - 1 8 1 6

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	J M	R L Y	G 0 8 0	Y							
X	A A	X C V	B 3 5 0	Y							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO		0 4	1 7	8 8

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

On January 17, 1988 at 0113 hours, a full Reactor Protection System (RPS) scram trip signal occurred during a surveillance test. The automatic actuations resulting from the trip signal were incomplete in that portions of the "B" trains of the Primary Containment System (PCS) and Secondary Containment System (SCS) did not actuate as designed. A Control Rod Drive (CRD) System vent valve did not close automatically. Following immediate investigation, the RPS trip signal and isolations were reset at 0135 hours.

The cause for the trip signal was inadequacy of the procedure being used for the surveillance. The cause for the incomplete automatic actuations was high contact resistance of two contacts of a logic relay. The cause for the CRD System vent valve not closing automatically was mechanical binding of the valve.

Corrective actions consisted of revising the surveillance procedure and replacing the logic relay. Corrective actions for the CRD System vent valve is pending the disassembly of the valve on site with a representative of the valve manufacturer.

This event occurred during an extended outage with negligible core decay heat and with the mode selector switch in the SHUTDOWN position. There were no control rods in the withdrawn position at the time of the trip signal.

This event posed no threat to the health and safety of the public.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

EVENT DESCRIPTION

On January 17, 1988 at 0113 hours, a full Reactor Protection System (RPS) trip signal occurred. The signal occurred during a surveillance test performed in accordance with Procedure number 8.M.2-2.1.2 "Reactor Level and Pressure Instrument Calibration". The signal occurred when a non-licensed utility Instrumentation and Control (I&C) technician was returning a reactor water level instrument to service following a satisfactory calibration check.

The trip signal resulted in several actuations that are summarized below.

- Primary Containment System (PCS) Group 1 reactor water (Recirculation System Loop "B") sample valves closed automatically as designed.

- PCS Group 3 Residual Heat Removal System (RHRS) shutdown cooling isolation valves closed automatically as designed.

- PCS Group 6 Reactor Water Cleanup (RWCU) System isolation valves closed automatically as designed.

- PCS/Containment Atmosphere Control System (CACS) Group 2 Drywell air purge inlet and exhaust isolation valves (AO-5035B and 5044B respectively) failed to close automatically as designed. The redundant in-series air purge inlet and exhaust isolation valves closed automatically.

- The "B" Train Secondary Containment System (SCS) supply and exhaust ventilation dampers failed to close automatically as designed. The redundant in-series Train "A" SCS supply and exhaust ventilation dampers closed automatically.

- The "B" Train PCS personnel access lock supply and exhaust ventilation dampers failed to close automatically as designed. The redundant in-series Train "A" access lock supply and exhaust ventilation dampers closed automatically.

- The "B" Train of the SCS/Standby Gas Treatment System (SGTS) failed to start automatically as designed. The redundant "A" Train of the SCS/SGTS started automatically.

- The vent valves of the Control Rod Drive (CRD) System scram discharge instrument volume (SDV) tanks (west and east) closed automatically as designed except for CV-302-23B (redundant vent valve for west SDV tank). The drain valves of the CRD System SDV tanks all closed automatically as designed.

Following immediate investigation, the RPS trip signal and isolations were reset on January 17, 1988 at 0135 hours. The "A" loop of the RHRS was returned to the shutdown cooling mode of operation at 0215 hours. The "B" train of the SGTS was returned to standby service at 0810 hours. The RWCU system was returned to service following the reset of the isolation.

Failure and Malfunction Report (F&MR) 88-12 was written to document the reactor scram trip signal. F&MR 88-13 was written to document the incomplete actuation of the SCS/ventilation dampers, SCS/SGTS, and PCS/CACS isolation valves; a priority Maintenance Request (MR 88-30) was issued to further investigate. F&MR 88-14 was written to document the failure of the SDV tank vent valve to close automatically; MR 88-31 was issued to further investigate. Notification of the trip signal and incomplete actuations was made to the NRC Operations Center on January 17, 1988 at 0500 hours.

This event occurred during an extended outage with plant conditions that were as follows. The mode selector switch was in the SHUTDOWN position. There was negligible core decay heat with the reactor water temperature at approximately 92 degrees Fahrenheit. The "A" loop of the RHRS was in the shutdown cooling mode of operation with the "A" pump in service. The RWCU System was in service. The process computer was out of service (from 0020 to 0900 hours).

CAUSE

The cause for the RPS trip signal was procedural inadequacy. The procedure did not contain sufficient instructions or cautions to alert the technician that air introduced into the sensing lines of local level indicator (LI-263-59A) during calibration could affect other instruments mounted on the same RPS Instrumentation Rack (C-2205). The (trapped) air introduced a fluctuation in the sensing lines when LI-263-59A was being returned to service. The fluctuation was sensed by level indicating switches LIS-263-57A -57B ,-72A and -72C as an abnormal reactor water level that was sufficient to generate the RPS trip signal. These level indicating switches share a sensing line that is common to the local level indicator.

The cause for the failure of the "B" trains of the PCS and SCS to actuate automatically was the failure of logic relay RPWBO contacts 3 (three) and 4 (four) to establish electrical continuity when the relay became de-energized. The relay is normally energized with the contacts in the open position. The designed response of the relay is to become de-energized as a result of an RPS signal. The relay functioned properly except for contacts 3 and 4 that did not close sufficiently for electrical continuity. The contact resistance of the contacts was measured in the meg-ohms region when the relay was tested in the de-energized state. Based on the results of our continuing investigation for determining root cause, a supplement to this report will be issued. Relay RPWBO is a 125 VDC type HFA (Model 12HFA151A2H) relay manufactured by General Electric.

The cause for the west SDV tank vent valve (CV-302-23B) failing to close automatically was confirmed to be mechanical binding of the valve. The valve is controlled by air from a solenoid operated valve that also controls the west SDV tank drain valve CV-302-22B. The drain valve closed automatically as designed. The air to the vent valve was disconnected in order to investigate the possibility that the vent valve did not close because of a pneumatic problem. The vent valve did not close as a functional valve would when the air was removed. The vent valve did not close when a manual attempt was made using the valve's handwheel. The vent valve is a one inch Y-pattern globe valve, model 105DAB6-001, manufactured by the Borg-Warner Corporation.

CORRECTIVE ACTION

The surveillance procedure (8.M.2-2.1.2) was revised following review, and approved on January 30, 1988. The additional instructions provided for isolating, connecting and disconnecting test equipment, and returning local level indicators LI-263-59A and -59B to service are expected to preclude the likelihood of a recurrence in the future.

The relay (RPWBO) was replaced with a new relay. The new relay was tested prior to installation and post work tested with satisfactory results following installation. The removed relay was controlled and delivered to General Electric's Relay Test Laboratory to determine the cause for the high contact resistance. The investigation revealed that the contact wipe, i.e. contacted surface area of contacts 3 and 4 was insufficient to establish adequate electrical continuity when the relay was de-energized.

Corrective action for the vent valve has not been completed at the time of submittal of this report. Disassembly of the valve on site with a representative of the valve manfacturer has been scheduled following the receipt of acceptable parts.

SAFETY CONSEQUENCES

This event posed no threat to the health and safety of the public.

The event occurred during an extended outage while in the cold shutdown condition with negligible core decay heat and with no control rods in the withdrawn position

Had this event occurred during operation with any or all control rods in the withdrawn position, the control rods would have been inserted automatically into the core thereby placing the reactor in a shutdown condition.

The portions of the PCS and SCS that failed to actuate automatically was compensated by the redundant portions that actuated automatically as designed.

The failure of a SDV tank vent or drain valve to close automatically is compensated by the automatic closing of the redundant vent or drain valve installed for each SDV tank. Each vent or drain valve may also be operated through the use of a handwheel. In the unlikely event that both vent valves or both drain valves of a SDV tank did not close automatically or could not subsequently be closed manually, the water from the tank(s) would be directed to the Reactor Building equipment sump. The function of the CRD System to insert the control rods into the core would not be effected by the open position of both vent valves or both drain valves of either or both SDV tanks.

Control Room operator corrective actions for response to alarms or malfunctions are addressed in procedures that include: 2.1.6, "Reactor Scram"; 2.2.50, "Standby Gas Treatment"; 2.2.70, "Primary Containment Atmosphere Control System; 2.4.25, "Loss of Shutdown Cooling"; and 2.4.27, "Reactor Water Cleanup System Malfunctions".

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

The RPS trip signal was determined to be reportable pursuant to 10CFR50.73 (a)(2)(iv) because the signal was not an expected part of the surveillance. The interruption in the operation of the RHRS/shutdown cooling and RWCU System was determined to be reportable pursuant to 10CFR50.73(a)(iv) because the automatic closing of the isolation valves of those systems, although an expected part of the RPS trip signal, was an unnecessary challenge to the valves. The failure of the "B" trains of the SCS and PCS to actuate was determined to be reportable pursuant to 10CFR50.73(a)(2)(vii) because a single cause (relay RWPBO) resulted in the failure (incomplete actuation) of more than one train of different systems designed to mitigate the consequences of an accident.

SIMILARITY TO PREVIOUS EVENTS

A review of Pilgrim Station Licensee Event Reports (LERs) written since January 1984 was conducted. The review focused on LERs submitted pursuant to 10CFR50.73(a)(2)(iv) involving actuation of the RPS that were caused by procedural inadequacy.

The review identified a similar event reported in LER 50-293/84-014-00. For that event, a full RPS scram signal occurred during a refueling outage. The signal occurred during maintenance for the SDV (half signal generated) concurrent with a loss of power to the "B" RPS motor generator set. The cause for the loss of power was procedural inadequacy.

The review also included a review of Pilgrim Station LERs written since January 1984 for which the cause was identified as the failure of a 125 VDC HFA relay. No previous failures were identified.

ENERGY INDUSTRY INDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this event are as follows:

COMPONENTS	CODES
Relay (RPWBO)	RLY
Valve (CV-302-23B)	XCV

SYSTEMS

Containment Combustible Gas Control System (CACS)	BB
Containment Isolation Control System (PCIS/RBIS)	JM
Control Rod Drive System (CRD)	AA
Engineered Safety Features Actuation System (PCIS/RBIS/RPS)	JM
Primary Containment System (PCS)	JM
Reactor Building (SCS)	NG
Reactor Water Cleanup System (RWCU)	CE
Residual Heat Removal System (RHRS/shutdown cooling)	BO
Standby Gas Treatment System (SGTS)	BH

10CFR50.73

BOSTON EDISON
Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

Ralph G. Bird
Senior Vice President — Nuclear

February 16, 1988
BECo Ltr. #88-023

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

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

Dear Sir:

The attached Licensee Event Report (LER) 88-002-00 "Full Scram Trip Signal During Surveillance and Resulting Incomplete Actuations" is submitted in accordance with 10CFR Part 50.73.

Please do not hesitate to contact me if you have any questions regarding this subject.

R.G. Bird

DWE/bl

Enclosure: LER 88-002-00

cc: Mr. William Russell
Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Rd.
King of Prussia, PA 19406

Sr. Resident Inspector - Pilgrim Station

Standard BECo LER Distribution

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