



BOSTON EDISON

Pilgrim Nuclear Power Station
Rocky Hill Road
Plymouth, Massachusetts 02360

George W. Davis
Senior Vice President - Nuclear

February 25, 1991
BECo Ltr 91-019

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) 91-001-00, "Automatic Closing of the Primary Containment System Group 5 Isolation Valves During Surveillance Testing", is submitted in accordance with 10 CFR Part 50.73.

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



G. W. Davis

TFM/bal

Enclosure: LER 91-001-00

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

Sr. NRC Resident Inspector - Pilgrim Station
Standard BECo LER Distribution

9103010183 910225
PDR ADOCK 05000293
S PDR

IF22
111

LICENSEE EVENT REPORT (LER)

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20556, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station DOCKET NUMBER (2) 0 5 0 0 0 2 1 9 3 1 OF 0 1 4

TITLE (4) Automatic Closing of the Primary Containment System Group 5 Isolation Valves During Surveillance Testing

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

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more of the following) (11)
N	20.402(b) <input checked="" type="checkbox"/> 20.406(c) <input checked="" type="checkbox"/> 50.73(a)(2)(iv) <input checked="" type="checkbox"/> 73.71(b) <input type="checkbox"/>
POWER LEVEL (10) 100	20.406(a)(1)(i) <input type="checkbox"/> 50.38(a)(1) <input checked="" type="checkbox"/> 50.73(a)(2)(v) (D) <input type="checkbox"/> 73.71(a) <input type="checkbox"/>
	20.406(a)(1)(ii) <input type="checkbox"/> 50.38(c)(2) <input type="checkbox"/> 50.73(a)(2)(vi) <input type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 366A) <input type="checkbox"/>
	20.406(a)(1)(iii) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/>
	20.406(a)(1)(iv) <input type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/>
	20.406(a)(1)(v) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(ix) <input type="checkbox"/>

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
Thomas F. McElhinney - Senior Compliance Engineer	5 10 18 7 4 1 7 - 8 4 6 5

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRCDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRCDS
X	B	N	1 6 1 5	W 2 9 0	Y				

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
<input checked="" type="checkbox"/>	<input type="checkbox"/>				

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

On January 25, 1991 at 0956 hours and at 1407 hours, an automatic Primary Containment Isolation Control System (PCIS) Group 5 actuation occurred during surveillance testing. The actuations resulted in the automatic closing of the Reactor Core Isolation Cooling System (RCICS) turbine steam supply isolation valves. The RCICS was declared inoperable and a 7 day Technical Specification Limiting Condition for Operation (LCO) began.

The actuations were caused by a RCICS turbine steam supply line high flow condition. The high steam flow condition occurred due to a failed transistor in the system's turbine speed control electric governor (EG-M) which was manufactured by the Woodward Governor Company (part number 8720-849). An exact cause of the transistor failure could not be identified. However, the signal cable connecting the EG-M to the turbine control valve hydraulic actuator (EG-R) was found to be degraded. This degradation could have led to the transistor failure. The cable was supplied by the Woodward Governor Company (part number 232007). The transistor and the cable were replaced. The RCICS turbine speed control system was subsequently calibrated. The RCICS was satisfactorily tested and the 7 day LCO was terminated on January 29, 1991 at 2139 hours.

This event occurred during power operation while at 100 percent reactor power. The reactor mode selector switch was in the RUN position. This report is submitted in accordance with 10 CFR 50.73 subparts (a)(2)(iv) and (a)(2)(v)(D), and this event posed no threat to the public health and safety.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 3	LER NUMBER (6)			PAGE (3)	
		YEAR 9 1	SEQUENTIAL NUMBER — 0 0 1	REVISION NUMBER — 0 0	Q 2 OF 0 4	

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

BACKGROUND

The Reactor Core Isolation Cooling System (RCICS) turbine steam supply line flow is sensed by differential pressure transmitters (DPIS 1360-1A and -1B) that provide a steam line break detection function. A high steam flow signal in one or both logic channels will actuate the Group 5 portion of the Primary Containment Isolation Control System (PCIS) to limit the release of steam if a break in the RCICS turbine steam supply line occurs. The Group 5 portion of the PCIS controls the RCIC turbine steam supply valves (MO-1301-16 and -17) which close on the isolation signal.

EVENT DESCRIPTION

On January 25, 1991 at 0956 hours, an unplanned automatic actuation of the RCICS portion of the PCIS occurred during a monthly surveillance test. The RCICS was being tested in accordance with procedure number 8.5.5.1 (Rev. 31), "RCIC Pump Operability Flow Rate and Valve Test at Approximately 1000 PSIG". When the operator opened the RCICS turbine steam inlet valve (MO-1301-61), the turbine tripped with a RCICS high steam flow alarm indication in the control room.

Inspections of the accessible RCICS steam piping outside Primary Containment did not identify any leakage from the RCICS steam supply piping. The RCICS was declared inoperable on January 25, 1991 at 1053 hours and a seven (7) day Technical Specification (3.5.D) Limiting Condition for Operation (LCO) was entered.

Operability testing of the High Pressure Coolant Injection System (HPCIS) began in accordance with Technical Specification 3.5.D.2 on January 25, 1991 at 1215 hours and was completed satisfactorily at 1338 hours.

The RCICS steam line flow instrumentation (DPIS 1360-1A and -1B) was then functionally tested and calibrated in accordance with Procedure 8.M.2-2.6.1 (Rev. 19), "PCIC Steam Line High Flow", with satisfactory as-found results. The operators attempted to re-test RCICS in accordance with Procedure 8.5.5.1 as part of the initial troubleshooting and investigation. However, the RCICS turbine steam supply valves automatically closed after the turbine steam inlet valve was opened at 1407 hours.

Failure and Malfunction Report (F&MR) 91-33 was written to document the first event and F&MR 91-34 was written to document the second event. The NRC Operations Center was notified of the first and second events on January 25, 1991 at 1059 hours and 1426 hours, respectively.

This event occurred during power operation with the reactor mode selector switch in the RUN position. The Reactor Vessel (RV) pressure was 1035 psig with the RV temperature at 530 degrees Fahrenheit. The reactor power level was 100 percent.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 60.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Pilgrim Nuclear Power Station

0 5 0 0 0 2 9 3

9 1

—

0 0

1

—

0 0

0

3

OF

0

4

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

CAUSE

The direct cause of the PCIS actuations was RCICS turbine steam supply line high flow. The high flow setpoint was satisfactorily checked after the first event in accordance with Procedure 8.M.2-2.6.1 (Rev. 19) Attachment 2, "RCIC Steam Line High Flow Instrument Functional and Calibration Test". Further troubleshooting identified the cause of the high steam flow condition to be the failure of a transistor (Q10) in the turbine speed control system electric governor (EG-M). The EG-M provides a signal to the turbine speed control system hydraulic actuator (EG-R) which positions the turbine governor valve to achieve the desired speed control. Transistor Q10 functions to transmit the close signal to close the governor valve, thus reducing speed. Due to the transistor failure, no close signal was transmitted to the EG-R; therefore, the governor valve remained in the full open position throughout the RCICS start sequence.

The exact cause of the transistor failure was not identified. However, the cable connecting the EG-M to the EG-R was found to be embrittled inside the EG-M control box. The cable embrittlement may have led to the transistor failure. An investigation is ongoing to the cause of the cable embrittlement. Initial results indicate the cable embrittlement resulted from thermal aging due to past exposure to heat and humidity. Recent testing found that the RCICS quadrant temperatures were below the cable temperature rating. Handling of the cable during maintenance and surveillance activities may have contributed to the cable failure. The EG-M and cable were manufactured by the Woodward Governor Company (part numbers 8720-849 and 232007, respectively).

CORRECTIVE ACTIONS

The transistor was replaced. Field Revision Notice 91-02-02 was implemented that replaced the EG-M to EG-R cable with a spare cable. Other cables in the RCICS quadrant were inspected and were found to be satisfactory. This LER will be updated if any significant corrective actions are taken as a result of the ongoing investigation.

Following the replacement of the transistor and cable the system was successfully calibrated in accordance with Procedure 8.E.13.1 (Rev. 1), "RCIC Turbine Speed Control System Calibration", with satisfactory results. The RCICS operability test was completed satisfactorily in accordance with Procedure 8.5.5.1. The RCICS was declared operable and the seven day LCO was terminated on January 29, 1991 at 2139 hours.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Pilgrim Nuclear Power Station

0 5 0 0 0 2 9 3 9 1 - 0 0 1 - 0 0 0 4 OF 0 4

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

SAFETY CONSEQUENCES

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

The RCICS high steam flow isolation is designed to mitigate the consequences of a break in the RCICS turbine steam supply line. The automatic closing of the RCIC turbine steam supply isolation valves prevents excessive loss of reactor coolant and the release of significant amounts of radioactive materials from the nuclear system process barrier if a break occurs. For this event, no break in the RCICS turbine steam line occurred. The high steam flow trip setpoint is set conservatively low at Pilgrim Station to provide timely detection of a RCICS turbine steam line break.

The HPCIS was operable during the period the RCICS was inoperable. During the period the RCICS was inoperable, appropriate LCO testing was conducted in accordance with Procedure 8.5.4.1 Rev. 37, "High Pressure Coolant Injection System Pump and Valve Monthly/Quarterly Operability".

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv) because the PCIS actuations were not a planned part of the surveillance test. This report is also submitted in accordance with 10 CFR 50.73(a)(2)(v)(D) because the RCICS was inoperable.

SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted since January 1984. The review was focused on LERs submitted in accordance with 10 CFR 50.73(a)(2)(iv) or (a)(2)(v) involving the RCICS and the HPCIS. This review did not identify any similar events.

ENERGY INDUSTRY IDENTIFICATION (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTS

Control, speed
Governor
Cable

CODES

SC
65
CBL

SYSTEMS

Engineered Safety Features Actuation System (PCIS)
Reactor Core Isolation Cooling System (RCICS)
High Pressure Coolant Injection System (HPCIS)

JE
BN
BJ