



10 CFR 50.73

**BOSTON EDISON**

Pilgrim Nuclear Power Station  
Rocky Hill Road  
Plymouth, Massachusetts 02360

April 14, 1993  
BECo Ltr. 93- 52

**E. T. Boulette, PhD**  
Senior Vice President — Nuclear

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

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

The enclosed Licensee Event Report (LER) 93-006-00, "Reactor Building-to-Torus Train 'B' Vacuum Relief System Actuation While Shut Down", 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.

E. T. Boulette

DWE/bal

Enclosure: LER 93-006-00

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Standard BECo LER Distribution

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## LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAF WORK REDUCTION PROJECT (3150-0104) OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1) Pilgrim Nuclear Power Station DOCKET NUMBER (2) 05000293 PAGE (3) 1 OF 4

TITLE (4) Reactor Building-to-Torus Train 'B' Vacuum Relief System Actuation While Shut Down

EVENT DATE (5)			LER NUMBER (6)			REPORT NUMBER (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	15	93	93	006	00	04	14	93	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)
N	20.402(b) <input type="checkbox"/> 20.405(c) <input checked="" type="checkbox"/> 50.73(a)(2)(iv) <input type="checkbox"/> 73.71(b) <input type="checkbox"/>
POWER LEVEL (10) 000	20.405(a)(1)(i) <input type="checkbox"/> 50.36(c)(1) <input type="checkbox"/> 50.73(a)(2)(v) <input type="checkbox"/> 73.71(c) <input type="checkbox"/>
	20.405(a)(1)(ii) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> OTHER <input type="checkbox"/>
	20.405(a)(1)(iii) <input type="checkbox"/> 50.73(a)(2)(i) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> (Specify in Abstract below and in Text, NRC Form 306A)
	20.405(a)(1)(iv) <input type="checkbox"/> 50.73(a)(2)(ii) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/>
	20.405(a)(1)(v) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/>

## LICENSEE CONTACT FOR THIS LER (12)

NAME Douglas W. Ellis - Senior Compliance Engineer TELEPHONE NUMBER (Include Area Code) (508) 747-8160

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRRDS

## SUPPLEMENTAL REPORT EXPECTED (14)

YES ☐ (If yes, complete EXPECTED SUBMISSION DATE) X NO ☒ EXPECTED SUBMISSION DATE (15) MONTH DAY YEAR

## ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 15, 1993, at approximately 2200 hours, indications of an actuation of the Reactor Building-to-Torus Train 'B' Vacuum Relief System were discovered while shut down. The discovery occurred as a result of investigating the pressure decay rate of the air system for AO-5040B. Investigation also revealed the in-series check valve X-212B had opened.

The cause was negative differential pressure between the Torus atmosphere and Reactor Building atmosphere. The Torus atmosphere pressure was decreasing as a result of lowering the Torus water level. The Reactor Building atmospheric pressure was affected by the passing of a severe coastal storm. The differential pressure was sensed by the sensor that controls AO-5040B. The sensor was subsequently calibrated with satisfactory as-found results. Corrective action taken included the addition of nitrogen to the Torus atmosphere.

The event occurred while shut down with the reactor mode selector switch in the STARTUP position for front panel checks. The Reactor Vessel (RV) pressure was zero psig with the RV water temperature at 140 degrees Fahrenheit. This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv). This event posed no threat to public health and safety.

REQUIRED NUMBER OF DIGITS/CHARACTERS  
FOR EACH BLOCK

BLOCK NUMBER	NUMBER OF DIGITS/CHARACTERS	TITLE
1	UP TO 46	FACILITY NAME
2	8 TOTAL 3 IN ADDITION TO 05000	DOCKET NUMBER
3	VARIES	PAGE NUMBER
4	UP TO 76	TITLE
5	6 TOTAL 2 PER BLOCK	EVENT DATE
6	7 TOTAL 2 FOR YEAR 3 FOR SEQUENTIAL NUMBER 2 FOR REVISION NUMBER	LER NUMBER
7	6 TOTAL 2 PER BLOCK	REPORT DATE
8	UP TO 18 -- FACILITY NAME 8 TOTAL -- DOCKET NUMBER 3 IN ADDITION TO 05000	OTHER FACILITIES INVOLVED
9	1	OPERATING MODE
10	3	POWER LEVEL
11	1 CHECK BOX THAT APPLIES	REQUIREMENTS OF 10 CFR
12	UP TO 50 FOR NAME 14 FOR TELEPHONE	LICENSEE CONTACT
13	CAUSE VARIES 2 FOR SYSTEM 4 FOR COMPONENT 4 FOR MANUFACTURER NPRDS VARIES	EACH COMPONENT FAILURE
14	1 CHECK BOX THAT APPLIES	SUPPLEMENTAL REPORT EXPECTED
15	6 TOTAL 2 PER BLOCK	EXPECTED SUBMISSION DATE

**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 INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
Pilgrim Nuclear Power Station		05000 293		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 4
				93	006	00	

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

**BACKGROUND**

The safety objective of the Primary Containment System (PCS) is to provide the capability, in conjunction with other safeguard features, to limit the release of fission products in the event of a design basis accident so that offsite doses would not exceed the guidelines set forth in 10 CFR 100. The PCS design employs a low leakage pressure suppression containment system which houses the Reactor Vessel (RV), the Reactor Recirculation System loops and other branch connections of the Reactor Primary System.

The Venting and Vacuum Relief System is part of the PCS design. The purpose is to equalize the pressure between the Drywell and Suppression Chamber and Reactor Building so that the structural integrity of the containment is maintained. The vacuum relief system from the Suppression Chamber (i.e., Torus) to the Reactor Building consists of two 100 percent vacuum relief trains with two valves in series. Operation of either train will maintain the pressure differential to less than 2.0 psig (i.e., the external design pressure). Train 'A' consists of AO-5040A and passive check valve X-212A. Train 'B' consists of AO-5040B and passive check valve X-212B. The controls and air supply for AO-5040A/B are similar but separate from each other. The actuator of each air-operated valve, normally maintained in the closed position by pressurized air, is spring loaded to open for vacuum relief. The actuator spring opens the valve if sufficient air pressure is not supplied to the actuator. Pressure switch PISD-5040B senses the differential pressure between the Torus atmosphere and atmosphere within the Reactor Building. The pressure switch or a manual control switch in the control room functions to de-energize solenoid operated valve SV-5040B, thereby venting the air pressure from the actuator and the opening of AO-5040B.

The pressure and pressure decay rate of the air systems for AO-5040A/B are checked in accordance with procedure 8.C.36 (currently Rev. 3), "Suppression Chamber to Reactor Building Vacuum Breaker Accumulator Leakage Monitoring Once Per Shift".

**EVENT DESCRIPTION**

On March 15, 1993, at approximately 2200 hours, indications of an actuation of the Reactor Building-to-Torus Train 'B' Vacuum Relief System were discovered while shutdown. The discovery occurred as a result of investigating the pressure decay rate of the air system for AO-5040B.

At 1530 hours, the air system pressure for AO-5040B was calculated to have decreased approximately 7 (seven) psi. Investigation found AO-5040B to be closed but plant computer (EPIC) information indicated the valve had cycled several times beginning at 2226 hours on March 14, 1993. Investigation also revealed X-212B had opened.

LICENSEE EVENT REPORT (LER)  
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FACILITY NAME (1)		DOCKET NUMBER (2)		LER NUMBER (6)			PAGE (3)
Pilgrim Nuclear Power Station		05000 293		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	OF 4
				93	006	00	

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Immediate actions taken consisted of the initiation of a calibration of PISD-5040A and PISD-5040B and the addition of nitrogen to the Torus atmosphere.

Problem Report 93.9092 was written to document the discovery. The NRC Operations Center was notified in accordance with 10 CFR 50.72 at 2215 hours on March 15, 1993.

The event occurred while shut down with the reactor mode selector switch in the STARTUP position for front panel checks. The RV pressure was zero psig with the RV water temperature at 140 degrees Fahrenheit.

CAUSE

The cause of the actuations of AO-5040B and indicated position of X-212B was negative differential pressure between the Reactor Building atmosphere and Torus atmosphere. The Torus atmosphere pressure was negative relative to the Reactor Building internal pressure. The Torus atmosphere pressure gradually decreased as a result of lowering the Suppression Pool level and temperature that had previously increased due to the addition of steam exhausted from the High Pressure Coolant Injection System turbine, Reactor Core Isolation Cooling System turbine, and Main Steam relief valves described in LER 93-004-00. The winds that followed the passing of a severe coastal storm affected the Reactor Building ventilation system and caused a slight increase in the Reactor Building atmosphere pressure. Together, the pressures in the Torus and Reactor Building resulted in a negative differential pressure. The differential pressure was sensed by PISD-5040B that caused AO-5040B to cycle.

The calibration of PISD-5040A and PISD-5040B was performed in accordance with procedure 8.M.3-4 (Rev. 15) Attachment 1, "Reactor Building to Suppression Chamber Vacuum Breaker Sensor Functional and Calibration Test", with satisfactory as-found results. The as-found trip settings of PISD-5040A and PISD-5040B were 0.347 psi (9.60 inches of water) and 0.329 psi (9.13 inches of water), respectively.

A sufficiently negative differential pressure condition between the Reactor Building atmosphere and Torus atmosphere would be expected to be alarmed at Control Room Panel C-7. The alarm is initiated only if PISD-5040A actuates. The differential pressure was not sufficient to actuate PISD-5040A. Consequently, AO-5040A stayed closed and the alarm did not occur.



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
Pilgrim Nuclear Power Station	05000 293	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	4 OF 4
		93	006	00	

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

## CORRECTIVE ACTION

The negative differential pressure between the Torus atmosphere and Reactor Building atmosphere was eliminated by the addition of nitrogen to the Torus atmosphere. The nitrogen was added to slightly increase the Torus atmosphere pressure. Valve AO-5040B was opened using its control switch and check valve X-212B was reseated by the relative positive Torus atmosphere pressure. Valve AO-5040B was closed after X-212B was reseated.

## SAFETY CONSEQUENCES

This event posed no threat to public health and safety.

There were no component or system failures that caused or resulted from the event.

This report is submitted in accordance with 10 CFR 50.73(a)(2)(iv) because the cycling of AO-5040B in conjunction with the opening of X-212B, indicated the Train 'B' Vacuum Relief System had actuated for the vacuum relief function.

## SIMILARITY TO PREVIOUS EVENTS

A review was conducted of Pilgrim Station Licensee Event Reports (LERs) submitted since January 1984. The review focused on LERs submitted in accordance with 10 CFR 50.73(a)(2)(iv) involving the Reactor Building-to-Torus vacuum breakers or the Torus-to-Drywell vacuum breakers. The review identified no previous instance of an actuation of the Reactor Building-to-Torus vacuum breakers or the Torus-to-Drywell vacuum breakers.

## ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

### COMPONENTS

Control, Differential, Pressure (PISD-5040B)  
Indicator, Differential, Pressure (PISD-5040B)  
Relief Valve (AO-5040B, X-212B)

### CODES

PDC  
PDI  
RV

### SYSTEMS

Containment Vacuum Relief System  
Containment Environmental Monitoring System  
Reactor Building

BF  
IK  
NG