



**Boston Edison**

Pilgrim Nuclear Power Station  
Rocky Hill Road  
Plymouth, Massachusetts 02360

10 CFR 50.73

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

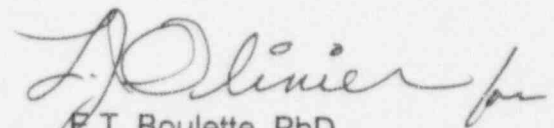
April 24, 1995  
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U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555

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

The enclosed Licensee Event Report (LER) 95-004-00, "Drywell-to-Torus Vacuum Relief System Actuation While De-Inerting the Drywell", 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, PhD

DWE/lam/9500400

cc: Mr. Thomas T. Martin  
Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
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Sr. NRC Resident Inspector - Pilgrim Station

Standard BECo LER Distribution

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NRC Form 366 (5-92)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB NO.3150-0104 EXPIRES 5/31/95						
<b>LICENSEE EVENT REPORT (LER)</b>											
(See reverse for number of digits/characters for each block)											
FACILITY NAME (1) <b>PILGRIM NUCLEAR POWER STATION</b>					DOCKET NUMBER (2) <b>05000-293</b>			PAGE(3) <b>1 of 5</b>			
TITLE (4) <b>Drywell-to-Torus Vacuum Relief System Actuation While De-Inerting the Drywell</b>											
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	
03	24	95	95	004	00	04	24	95	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(h)			20.45(c)			X	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10)			20.405(a)(1)(i)			50.36(c)(1)				50.73(a)(2)(v)	73.71(c)
000			20.405(a)(1)(ii)			50.36(c)(2)				50.73(a)(2)(vii)	OTHER
			20.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)		(specify in Abstract below and in Text, NRC Form 366A)
			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 <b>Douglas W. Ellis - Senior Compliance Engineer</b>						TELEPHONE NUMBER (Include Area Code) <b>508-830-8160</b>					
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	
SUPPLEMENTAL REPORT EXPECTED (14)											
YES (If yes, complete EXPECTED SUBMISSION DATE)					NO						
					X						
					EXPECTED SUBMISSION DATE(15)						
					MONTH DAY YEAR						
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)											
<p>On March 24, 1995, at approximately 1101 hours, the Drywell-to-Torus portion of the Primary Containment Vacuum Relief System actuated while de-inerting the Drywell. Initial utility licensed operator actions were taken in accordance with approved procedure. The actions included investigating the cause and ensuring applicable Technical Specifications were satisfied. The NRC Operations Center was notified in accordance with 10 CFR 50.72 at 1311 hours on March 24, 1995. There were no component or system failures that caused or resulted from this event.</p> <p>The cause was a deficiency in the approved procedure being used for de-inerting. Corrective action planned includes revision of the procedure to correct the procedure deficiency.</p> <p>The event occurred while shut down following a manual scram at 0750 hours. The reactor mode selector switch was in the REFUEL position for front panel checks. The Reactor Vessel (RV) pressure was approximately 970 psig with the RV water temperature at approximately 540 degrees Fahrenheit. The event posed no threat to the public health and safety.</p>											

## 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.

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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 (i.e., Torus) and Reactor Building so the structural integrity of the containment is maintained. The Vacuum Relief System from the Drywell-to-Torus consists of 10 normally closed vacuum relief valves (i.e., vacuum breakers). The Drywell-to-Torus vacuum breakers (X-201 A to K) are sized and function to limit the differential pressure between the Drywell and Torus during post accident Drywell cooling operations to the design limit of 2.0 psig (i.e., the external design pressure). Each of the Drywell-to-Torus vacuum breakers is equipped with three position switches. One switch provides full open position indication only. The other two switches provide redundant signals of vacuum breaker disc position to Control Room indicators and annunciators if the disc(s) is open more than approximately 3/32 of an inch. Pressure switch PS-5045 senses Drywell pressure. Manual control switches in the Control Room function to operate air operated valves AO-5045A to K for surveillance testing of vacuum breakers X-201A to K. Pressure switch PS-5045 functions to override the manual control switches. Vacuum breakers X-201A to K are passive, normally closed and open on Drywell-to-Torus differential pressure only.

The vacuum relief system from the 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 Torus-to-Reactor Building pressure differential to less than the external design pressure of 2.0 psig. 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 PSD-5040A/B 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-5040A/B, thereby venting pneumatic pressure from the actuator and the opening of AO-5040A/B.

Instruments are used to assure the Drywell-Torus atmosphere differential pressure is maintained as specified by Technical Specification 3.7.A.1.i (greater than or equal to 1.17 psid). The instruments are checked via Procedure 2.1.15, "Daily Surveillance Log". The differential pressure may be reduced to less than 1.17 psid 24 hours prior to a shutdown.

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

Technical Specification 3.7.A.4 specifies the operability requirements of the Drywell-to-Torus vacuum breakers. Essentially, the vacuum breakers are required to be operable when primary containment is required except during testing and other certain conditions. Essentially, primary containment is required when the reactor is critical or when the reactor vessel water temperature is greater than 212°F, except when performing certain low power tests.

Technical Specification 3.7.A.5.a specifies the Drywell and Torus atmosphere oxygen concentration be maintained less than 4% oxygen by volume with nitrogen gas during power operation with reactor coolant pressure above 100 psig except for certain conditions specified by Technical Specification 3.7.A.5.b that includes provision for de-inerting that may commence 24 hours prior to a shutdown. The Drywell and Torus atmosphere oxygen concentrations are also checked via Procedure 2.1.15.

A manual scram was initiated at 0750 hours on March 24, 1995. The event is separately reported via LER 95-003. Drywell de-inerting, i.e. purging the Drywell atmosphere of nitrogen, commenced at 0950 hours as part of activities following the scram. The Reactor Vessel (RV) was maintained in a pressurized state pending Drywell de-inerting and subsequent Drywell entry for planned Drywell inspections.

EVENT DESCRIPTION

On March 24, 1995, at approximately 1101 hours, Control Room alarms and indications of an actuation of the Drywell-to-Torus Vacuum Relief System occurred while shut down. The event occurred while de-inerting the Drywell.

The event occurred during the performance of Procedure 2.2.70 (Rev. 50) section 7.4.1, "Drywell Purge through the Standby Gas Treatment System (SGTS)". For this de-inerting, the SGTS Train 'B' was in service to purge the Drywell of nitrogen.

Initial utility licensed operator actions were taken in accordance with Alarm Response Procedure (ARP) C7L for annunciator C12, "Drywell/Torus Vacuum Breaker Open". The actions included removing the SGTS Train 'B' from service and verifying the vacuum breakers were reseated. The actions also included investigating the cause and ensuring Technical Specifications 3.7.A.1.i and 3.7.A.4 were satisfied. After these actions were completed, the system was re-aligned for Drywell purging and purging was subsequently completed.

Problem Report 95.9142 was written to document the event. The NRC Operations Center was notified in accordance with 10 CFR 50.72 at 1311 hours on March 24, 1995.

The event occurred while shut down and while de-inerting the Drywell. The reactor mode selector switch in the REFUEL position for front panel checks. The RV pressure was 970 psig with the RV water temperature at approximately 540 degrees Fahrenheit.



**LICENSEE EVENT REPORT (LER)****TEXT CONTINUATION**

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**CAUSE**

The cause was a deficiency in Procedure 2.2.70 section 7.4.1. This section directs the operator to align the SGTs to vent nitrogen from the Drywell. This alignment results in a Drywell pressure decrease. When the Drywell pressure is nearly at atmospheric pressure, the operator is directed to align valves and fans to supply air to the Drywell. This requires the operator to open valves AO-5035A and AO-5035B and start the Drywell purge fans. The procedure did not include a step(s) or caution regarding the location of the dual control switches of Drywell purge supply valve AO-5035A. The control switches are located at Panels C-7 and C-904. Both control switches have to be in the OPEN position for the damper to be properly aligned. The control switch at Panel C-7 was placed in the OPEN position, however, valve AO-5035A did not open because the control switch at Panel C-904 was in the CLOSED position. The Drywell atmosphere pressure was decreasing as expected during the Drywell purging operation. The procedure did not note or indicate that when Drywell pressure is at or near atmospheric pressure, relatively quick licensed operator actions to align the purge supply valves and start the purge fans are necessary to prevent a negative Drywell-to-Torus atmosphere pressure condition. After the control switch at Panel C-7 was put in the OPEN position and before the control switch at Panel C-904 was put in the OPEN position, a sufficient Drywell-to-Torus differential pressure condition occurred that resulted in the event.

The trip setting of the Drywell pressure switch PS-5045 is approximately 2.0 psi (increasing). The trip setting of the Torus-to-Reactor Building differential pressure switches PISD-5040A and PISD-5040B is approximately 0.3 psi. For this event, the Drywell-to-Torus differential pressure that occurred while purging the Drywell was sufficient to result in the opening of the Drywell-to-Torus vacuum breakers. The Torus-to-Reactor Building differential pressure resulting from the opening of the vacuum breakers was neither sufficient to cause a trip signal from PISD-5040A or PISD-5040B nor result in the opening of the Torus-to-Reactor Building vacuum breakers X-212A/B.

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

**CORRECTIVE ACTION**

Corrective action planned to preclude recurrence includes revision of Procedure 2.2.70 (currently Rev. 50). The focus of the revision is to strengthen the procedure regarding Drywell de-inerting.

**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 actuation of the Drywell-to-Torus vacuum breakers, although a designed response to the differential pressure resulting from de-inerting the Drywell, was not planned.

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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 Drywell-to-Torus vacuum breakers. The review identified no previous instance of an unplanned actuation of the Drywell-to-Torus vacuum breakers.

ENERGY INDUSTRY IDENTIFICATION SYSTEM (EIIS) CODES

The EIIS codes for this report are as follows:

COMPONENTSCODES

Relief Valve (AO-5045, X-201)  
Switch, Pressure (PS-5045)

RV  
63

SYSTEMS

Containment Vacuum Relief System  
Containment Environmental Monitoring System  
Reactor Building

BF  
IK  
NG