

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
Perry Nuclear Power Plant, Unit 1

DOCKET NUMBER (2)

0 5 0 0 0 4 4 0 1 OF 0 3

PAGE (3)

TITLE (4)

CVDPS Design Deficiency Causes Containment Vacuum Relief Valves To Open

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	6	1	7	8	6	8	6	0	2	5	0	1	2	8	6	0	5	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)

POWER LEVEL (10)

0 1 0 0

20.402(b)

20.406(a)(1)(i)

20.406(a)(1)(ii)

20.406(a)(1)(iii)

20.406(a)(1)(iv)

20.406(a)(1)(v)

20.406(e)

60.38(a)(1)

60.38(a)(2)

60.73(a)(2)(i)

60.73(a)(2)(ii)

60.73(a)(2)(iii)

60.73(a)(2)(iv)

60.73(a)(2)(v)

60.73(a)(2)(vi)

60.73(a)(2)(vii)(A)

60.73(a)(2)(vii)(B)

60.73(a)(2)(x)

73.71(b)

73.71(e)

OTHER (Specify in Abstract below and in Text, NRC Form 308A)

LAST KNOWN CONTACT FOR THIS LER (12)

NAME

Paul Russ, Compliance Engineer, ext. 6472

TELEPHONE NUMBER

AREA CODE

2 1 1 6 2 1 5 9 1 - 1 3 1 7 1 3 1 7

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)

X NO

EXPECTED SUBMISSION DATE (15)

MONTH DAY YEAR

ABSTRACT (Limit to 1000 words, i.e., approximately fifteen single-spaced typewritten lines) (16)

On June 17, 1986 at 0840, the Containment Vacuum Relief System Valves opened while the Containment Vessel and Drywell Purge System (CVDPS) was running in the refuel mode. Prior to the event air flows were adjusted for the Containment Vessel and Drywell Purge System in preparation for the performance of the Plant Environmental preoperational test. The Containment airlock doors were open allowing air flow into the Containment Building. When the airlock doors were closed for the continuation of the preoperational test, a vacuum was created in containment which resulted in the opening of the Containment Vacuum Relief Valves. The control room operators instructed technicians to re-adjust the Containment Purge System in order to restore pressure. At 0921, the vacuum was relieved and the Containment Vacuum Relief Valves were closed.

The root cause of this event was a design problem in the Containment Vessel and Drywell Purge Systems' supply and exhaust flow control logic. A design change will be incorporated which will enable the system to maintain a stable containment pressure. In addition, the current procedure governing the evaluation of design discrepancies has been revised to clarify the need for followup action to eliminate unnecessary safety system actuations.

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LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
Perry Nuclear Power Plant Unit 1	0500044P	86	025	01	02	OF	03

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

On June 17, 1986 at 0840, the Containment Vacuum Relief System Valves [BF] opened while the Containment Vessel and Drywell Purge System (CVDPS) [VB] was running in the refuel mode. The plant was in Operational Condition 5 (Refuel); reactor coolant temperature was approximately 100 degrees and reactor vessel pressure was atmospheric.

Prior to the event the CVDPS air flows were adjusted in preparation for Plant Environmental preoperational test activity. This test is intended to evaluate integrated plant ventilation. The system was maintaining flows consistent with those established during the CVDPS preoperational phase acceptance test. In this condition, the exhaust fans were exhausting more air than supplied by the supply fans. Throughout this time the Containment Building airlock doors [AL] were open and air was flowing through them into the Containment Building. At approximately 0815, flow adjustments were completed and the airlock doors subsequently closed to support the continuation of the Plant Environmental preoperational test. The system continued to exhaust more air than was being taken in by the supply fans thereby increasing the vacuum in the Containment Building. At 0840, the vacuum increased to the Containment Vacuum Relief Valves [RV] design setpoint and the valves subsequently opened.

The control room operators, alerted by Control Room annunciators [ANN], determined that the vacuum was caused by operation of the CVDPS. They then instructed the technicians to readjust the air flow as necessary in order to relieve the vacuum and close the vacuum relief valves. At 0921, the vacuum had been relieved and the vacuum relief valves were closed.

The root cause of this event was a design deficiency. The CVDPS supply and exhaust flow is regulated by flow sensors located in the respective fan plenums. Since the Containment Building is essentially an airtight structure, the slight differences between the total supply air and the total exhaust air flow rates resulted in an increasingly negative pressure which eventually caused the Containment Vacuum Relief Valves to open. The flow control logic maintained the flow through the respective fan plenums at the set air flow values without correcting for the decreasing pressure. In addition, when Engineering approved the system acceptance test air flow values it was noted that normal system operation in the refuel mode would cause a slight vacuum. However, Engineering failed to consider that unnecessary safety system actuations could result.

The Containment Vacuum Relief System is designed to prevent any pressure differential acting inward on the containment vessel from exceeding the design values of 0.8 psid. During this event the relief valves opened as designed at less than 0.1 psid. It is unlikely that this condition could have occurred during power operation since the Plant Environmental preoperational test was performed to identify and correct these type of problems. In addition, this mode of CVDPS operation is not used other than during shutdown/refuel

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

conditions. Consequently, this event had no safety significance. No previous similar events were identified.

In order to correct the design deficiency and prevent recurrence, a design change will be incorporated which will enable the CVDPS system to maintain a stable containment pressure. The design change will change the flow control logic on the CVDPS supply trains from a system based on fan plenum air flow to a system based on containment differential pressure. The CVDPS exhaust trains' flow control logic will continue to regulate exhaust air flow by means of exhaust fan plenum air flow. In addition, the current procedures governing the evaluation of design discrepancies have been revised to clarify the need for followup action to eliminate unnecessary safety system actuations.

Energy Industry Identification System Codes are identified in the text as [XX].