

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)
LaSalle County Station Unit 2

DOCKET NUMBER (2)
0 5 0 0 0 3 1 7 4

PAGE (3)
1 OF 0 3

TITLE (4)
HPCS Discharge Relief Valve Failure

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 9	0 6	8 4	8 4	0 6	8	0 0	1 0	0 3	8 4	0 5 0 0 0	

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9) 3	20.402(b)	20.405(a)	80.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) 0 1 0 0	20.405(a)(1)(i)	80.36(a)(1)	80.73(a)(2)(iv) <input checked="" type="checkbox"/>	73.71(a)
	20.405(a)(1)(ii)	80.36(a)(2)	80.73(a)(2)(iv)	OTHER (Specify in Abstract below and in Text, NRC Form 305A)
	20.405(a)(1)(iii)	80.73(a)(2)(i)	80.73(a)(2)(iv)(A)	
	20.405(a)(1)(iv)	80.73(a)(2)(ii)	80.73(a)(2)(iv)(B)	
	20.405(a)(1)(v)	80.73(a)(2)(iii)	80.73(a)(2)(v)	

LICENSEE CONTACT FOR THIS LER (12)

NAME: Vincent Masterson, extension 499

TELEPHONE NUMBER: 8 1 5 3 1 5 1 7 1 - 1 6 1 7 1 6 1 1

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
B	B I G	I R V C	7 1 1 0	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE) NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On September 6, 1984, the High Pressure Core Spray system (HPCS, BG) was declared inoperable as the result of the Unit 2 HPCS Discharge Relief Valve (2E22-F035) internal bellows seal failure. A Generating Station Emergency Plan (GSEP) "Unusual Event" was declared in accordance with Technical Specification 3.6.1.1. The bellows seal failure of the relief valve resulted in a degradation of the primary containment leakage boundary. Cold Shutdown was achieved at 0320 on September 7, 1984.

The cause for the bellows seal failure appears to be hydraulic forces on the seal inherent in the design of the HPCS system and the discharge of the relief valve.

The HPCS relief valve was repaired and tested operational under Work Request L40709. Work was completed by September 8, 1984.

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		84	068	000	02	OF	03

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

I. EVENT DESCRIPTION

At 0845 on September 6, 1984, the High Pressure Core Spray system (BG, HPCS) was declared inoperable. At the time of the occurrence, the Unit 2 HPCS system was being operated in the suppression pool to suppression pool mode for a test. After less than a minute, leakage in the form of a water spray was observed emanating from the Unit 2 HPCS discharge relief valve, 2E22-F035. Leakage of this nature tends to indicate a ruptured internal bellows seal assembly which was later verified. Since the bellows seal also provides a boundary for primary containment integrity, and the amount of leakage could not be readily determined, an "Unusual Event" was declared at 0910 on September 6, 1984, due to the requirement to proceed to Cold Shutdown per Technical Specification 3.6.1.1. At the time of the occurrence, the reactor was in "Hot Shutdown".

II. CAUSE

The cause for the failure of the HPCS discharge relief valve (2E22-F035) internal bellows seal assembly cannot be conclusively determined at this time. It appears that hydraulic forces being felt downstream on the discharge side of the relief valve are responsible for rupturing the internal bellows seal. The hydraulic forces present are inherent in the design of the HPCS system and the placement of the relief valve discharge. The relief valve discharges to the suppression pool along with the HPCS minimum flow bypass line and the HPCS return to suppression pool full flow test line. All three lines share a common line to the suppression pool. As a result, dynamic hydraulic forces are being felt on the discharge relief internal bellows seal.

This was proven by a LaSalle Special Test (LST-84-175). The results of the test showed that approximately 100 psi is present at the discharge side of the relief in the suppression pool to suppression pool full flow test mode. This amount of pressure combined with the effects of dynamic hydraulic forces could result in a failure of the internal bellows seal.

III. PROBABLE CONSEQUENCES OF THE OCCURRENCE

At the time of the occurrence the reactor was in Hot Shutdown.

The failure of the internal bellows seal does not affect the ability of the High Pressure Core Spray system to perform its design function. The HPCS system was still capable if challenged. The Division I and Division II Emergency Core Cooling system (BO, BM) components were fully operable and available.

The effect the bellows seal failure had on the plant was to provide a leakage path from the primary containment boundary through the weep hole in the relief valve bonnet. The leak rate through the failed bellows was tested on September 7, 1984, at 39.6 psi (Pa) and was determined to be 142 SCFH. This valve was added to the present containment leakage (previous type A result) of 135.9 SCFH along with a flowmeter error of 2.85 SCFH. This value (280.2 SCFH) was still determined to be below the maximum allowable primary containment leak rate of 385.7 SCFH (La). Because of this reason primary containment integrity

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TEXT IF more space is required, use additional NRC Form 206A's (17)

III. PROBABLE CONSEQUENCES OF THE OCCURRENCE (Continued)

was maintained.

IV. CORRECTIVE ACTION

Upon discovery of the failure of the HPCS discharge relief bellows, the HPCS system was declared inoperable at 0845 on September 6, 1984. A Generating Station Emergency Procedure (GSEP) "Unusual Event" was declared at 0910 on September 6, 1984, as the amount of leakage out of the primary containment was not readily apparent. The unit proceeded to Cold Shutdown in accordance with Technical Specification 3.6.1.1. Cold Shutdown was achieved at 0320 on 9/7/84.

Work Request L40709 was written to repair the valve. The bellows seal was replaced and leak tested (no leakage) and the valve re-installed in the HPCS system. The relief valve flange was leak rate tested (no leakage) on September 8, 1984, to 39.6 psi. The "As Left" primary containment leakage rate remained 135.9 SCFH (0.223%/DAY). Work Request L40709 was completed on September 8, 1984, and the HPCS system subsequently returned to service. The HPCS pump was run in the minimum flow mode to verify no leakage from the relief valve weep hole.

An investigation of the design of the discharge of this relief valve is being conducted to determine if design changes are required. (AIR 1-84-67108)

The vendor, Crosby Valve and Gage Company, has also been notified and the results of tests on the relief valve and failed bellows seal units have been sent for their analysis. (AIR 1-84-67149)

The HPCS full flow test return to suppression pool valve, 2E22-F023, handswitch was taken out-of-service to ensure that the suppression pool to suppression pool mode of operation would not be used except in Cold Shutdown or refueling until the relief valve problem is resolved. It appears that this mode of operation contributes to the relief valve bellows failure. This action does not affect valve 2E22 F023 operability, the ability to test the HPCS system as required by the Technical Specifications, or the Inservice Testing Program. (The corresponding Unit 1 valve, 1E22-F023, handswitch is also out-of-service.) Periodically the bellows will be observed for leakage when running the HPCS pump.

V. PREVIOUS OCCURRENCES

LER 374/84-030-00

VI. NAME AND TELEPHONE NUMBER OF PREPARER

Vincent Masterson, 815/357-6761, extension 499.



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October 3, 1984

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

Dear Sir:

Reportable Occurrence Report #84-068-00, Docket #050-374 is being submitted to your office in accordance with 10CFR 50.73.

C. E. Sargent

for G. J. Diederich
Superintendent
LaSalle County Station

GJD/MLD/kg

Enclosure

xc: NRC, Regional Director
INPO-Records Center
File/NRC

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