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Dresden Nuclear Power Station
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June 16, 1993

CWS PMLTR 93-0229

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

Licensee Event Report 92-023-01 Docket No. 050249 is being submitted as required by Technical Specification 6.6, NUREG 1022, and 10 CFR 50.73(a)(2)(i)(B).

This revised report is being submitted to identify the root cause and corrective actions for the Viton seat failure of LPCI pump discharge check valve, 3-1501-63A. Also, this report includes the determination of the 10CFR Part 21 reportable investigation.

Charles W. Schroeder for 6/23/93

Charles W. Schroeder
Station Manager
Dresden Station

CWS/slb

Enclosure

cc: J. Martin, Regional Administrator, Region III
NRC Resident Inspector's Office
File/NRC
File/Numerical




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DAP FORM 02-08C
 SUPPLEMENTAL REPORT TO LER

DVR NO.		SYSTEM AFFECTED
STA	UNIT	YEAR
NO.		1500
D - 12 - 3 - 92 - 023		
<u>PART 1</u>	TITLE OF EVENT	<u>OCCURRED</u>
	LPCI System Not Properly Filled Due to Failed LPCI Pump Discharge Check Valve	
	12/1/92	1300
	DATE	TIME
REASON FOR SUPPLEMENTAL REPORT		
To report the root cause and corrective actions for the Viton seat failure of LPCI pump discharge check valve 3-1501-63A. To report the determination of the 10 CFR Part 21 reportable investigation.		
<u>PART 2</u>		
ACCEPTANCE BY STATION REVIEW		
DATE	6/21/93	6/22/93
SUPPLEMENTAL REPORT APPROVED AND AUTHORIZED FOR DISTRIBUTION		6-23-93
	STATION MANAGER	DATE

LICENSEE EVENT REPORT (LER)

Form Rev 2.0

Facility Name (1) Dresden Nuclear Power Station, Unit 3	Docket Number (2) 0 5 0 0 0 2 4 9	Page (3) 1 of 0 4			
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Title (4)
LPCI System Not Properly Filled Due to Failed LPCI Pump Discharge Check Valve

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)								
1	2	0 1 9 2	9	2	...	0 2 3 ...	0	1	1	2	2	3	9	2	N/A				
															N/A				

OPERATING MODE (9) **N**

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

POWER LEVEL (10)			20.402(b)	20.405(a)(1)(i)	20.405(a)(1)(ii)	20.405(a)(1)(iii)	20.405(a)(1)(iv)	20.405(a)(1)(v)	20.405(c)	50.36(c)(1)	50.36(c)(2)	50.73(a)(2)(i)	50.73(a)(2)(ii)	50.73(a)(2)(iii)	50.73(a)(2)(iii)	50.73(a)(2)(iv)	50.73(a)(2)(v)	50.73(a)(2)(vii)	50.73(a)(2)(viii) (A)	50.73(a)(2)(viii) (B)	50.73(a)(2)(ix)	73.71(b)	73.71(c)	Other (Specify in Abstract below and in Text)	
													X												
		0 7 7																							

LICENSE CONTACT FOR THIS LER (12)

NAME Nicos P. Digrindakis, Technical Staff Engineer	TELEPHONE NUMBER Ext. 3584	AREA CODE 8 1 5	9 4 2 - 2 9 2 0
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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
B	B	O V	C 2 3 8	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

Expected Submission Date (15): **0 7 3 0 9 4**

X Yes (If yes, complete EXPECTED SUBMISSION DATE) **NO**

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

On December 1, 1992 at 1300 hours after securing the Unit 3 "A" Low Pressure Coolant Injection (LPCI) pump (pump was running to support the monthly High Pressure Coolant Injection (HPCI) system surveillance), the "LPCI Header Low Pressure" alarm was received. The shift supervisor was dispatched to check the LPCI system pressure at the LPCI heat exchangers and discovered that the LPCI system was not properly filled. At 1615 hours LPCI was determined to be inoperable based on Technical Specification 3.5.H, and Unit 3 entered a 24 hour LCO starting at 1300 hours. It was discovered that the cause of this condition was that the discharge check valve of the 3A LPCI pump was not sealing. The check valve was isolated and the LPCI header was filled. An inspection of the check valve revealed that the rubber seat had peeled away from the valve, eliminating a portion of the sealing area. The check valve was replaced and a potential 10 CFR Part 21 investigation was initiated on the failed valve. Later it was determined by Engineering Department not to be 10 CFR Part 21 reportable. The probable cause for failure is of the Viton rubber seats is chemical shock.

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		Year	Sequential Number	Revision Number							
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TEXT Energy Industry Identification System (EIIIS) codes are identified in the text as [XX]

PLANT AND SYSTEM IDENTIFICATION:

General Electric-Boiling Water Reactor-2527 Mwt rated core thermal power.

Nuclear Tracking System (NTS) tracking code numbers are identified in the text as (XXX-XXX-XX-XXXXX)

EVENT IDENTIFICATION:

Low Pressure Coolant Injection (LPCI) System not Properly Filled Due to Failed LPCI Pump Discharge Check Valve

A. CONDITIONS PRIOR TO EVENT:

Unit: 3 Event Date: December 1, 1992 Event Time: 1300 Hours
 Reactor Mode: N Mode Name: Run Power Level: 77%
 Reactor Coolant System (RCS) Pressure: 976 psig

B. DESCRIPTION OF EVENT:

On December 1, 1992 at 1300 hours after securing the Unit 3 "A" LPCI [BO] pump (pump was running to support the monthly High Pressure Coolant Injection (HPCI) [BJ] system surveillance), the "LPCI Header Low Pressure" alarm was received in the Control Room. At this time operators were dispatched to check for proper operation of the ECCS keep-fill pump. The operators reported that the pump appeared to be in good condition and showing a discharge pressure of 75 psig. At 1340 hours, the control room received a "Core Spray [BM] System Low Pressure" alarm (control room indication was showing 50 psig). The shift supervisor was dispatched to check the LPCI system pressure at the LPCI heat exchangers. Local pressure indication at both LPCI heat exchangers was reading zero. The shift supervisor opened the drain valves on the LPCI heat exchangers and verified water flow through the sight glass. However, the flow through the sight glass was significantly less than normal compared to when the system is pressurized. This indicated that the LPCI system was not properly filled. At 1615 hours, LPCI was determined to be inoperable based on Technical Specification 3.5.H, and Unit 3 entered a 24 hour LCO starting at 1300 hours on December 1, 1992 when the "LPCI Header Low Pressure" alarm was initially received. In an attempt to identify which LPCI loop was causing the problem, LPCI loop cross-tie valve MOV 3-1501-32A was closed and the following was observed: pressure on both Core Spray [BM] loops increased to normal (low pressure alarm cleared), pressure on "B" LPCI loop increased to 60 psig, and pressure on "A" LPCI loop remained at 0 psig. Since the 3A LPCI pump was the operating pump during the HPCI surveillance it was suspected that its discharge check valve was not sealing. The control switch for the 3A LPCI pump was placed in pull-to-lock, suction valve 3-1501-5A was closed, minimum flow valve 3-1501-13A was closed, the keep-fill pump was valved out, condensate transfer [KA] was valved in, and the "A" LPCI loop was vented and filled. This yielded a LPCI "A" loop pressure of 80 psig. Next, the following actions were taken while noting the effect on loop pressure:

ACTION
 Opened suction valve 1501-5A
 Closed suction valve 1501-5A
 Opened min flow valve 1501-13A
 Closed min flow valve 1501-13A

EFFECT
 pressure down to 7 psig.
 pressure up to 80 psig.
 pressure down to 7 psig.
 pressure up to 80 psig.

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TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]

This information confirmed that the 3A LPCI pump discharge check valve was not sealing.

The 3A LPCI pump was manually isolated and the LPCI and Core Spray systems were vented. At 2001 hours venting was completed and LPCI was declared operable (24 hour LCO was terminated). The 3A LPCI pump being inoperable resulted in the unit being in a 30 day LCO. The ECCS keep fill pump was placed back in operation and condensate transfer was secured.

C. APPARENT CAUSE OF EVENT:

This report is being submitted in accordance with 10CFR50.73(a)(2)(i)(B), which requires the reporting of any operation or condition prohibited by the plant's Technical Specification.

The loss of pressure in the LPCI "A" Loop header was due to failure of the "A" LPCI pump discharge check valve. The volume depressurized through the seats of the 3-1501-63A check valve, "A" LPCI pump, and into the "A" LPCI pump suction.

The cause for leakage through the seats was determined during an inspection of the check valve performed under work request D14474. The inspection revealed that the rubber seat of the valve had peeled away from the body, eliminating a portion of the sealing area. This check valve is a dual disk type manufactured by C & S Valve Company. A field engineer from the valve manufacturer was present and assisted during the inspection. Further inspection of the check valve revealed that the rubber (Viton) seat was in good condition, except for a tear halfway through the loose portion. This tear was probably caused by flow after the seat had peeled away from the body.

Further investigation of the root cause for the Viton seat failure determined that the most probable cause for failure is chemical shock to the seat material. The solvent (Synasol), used in cleaning, may have come into contact on the valve seats. Typically, the valves come from the storeroom with some debris on the seats. It is possible that the seats were cleaned using Synasol before installing the valve without knowing that the solvent can degrade the Viton rubber seats.

D. SAFETY ANALYSIS OF EVENT:

Technical Specification 3.5.H. states that whenever core spray, LPCI, or HPCI are required to be operable, the discharge piping from the pump discharge of these systems to the last check valve shall be filled. The basis for this requirement is that if the discharge piping of these systems were not filled, a water hammer could develop in this piping when the pump and/or pumps are started.

During this event, only the LPCI system on Unit 3 did not maintain its discharge piping filled. This condition existed for a period of approximately 7 hours. During this period all other ECCS were operable and available for injection into the reactor vessel. Additionally, all LPCI system components (with the exception of the 3A pump discharge check valve) were in a condition to perform their intended safety function although the increased risk of water hammer existed. For these reasons along with the relatively short period of time this condition existed, the safety significance of this event is considered minimal.

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		Year		Sequential Number			Revision Number				
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TEXT Energy Industry Identification System (EIS) codes are identified in the text as [XX]

E. CORRECTIVE ACTIONS:

The check valve was replaced with a new one of the same type and manufacturer under WR D14474. The system was run after the installation of the new check valve, and the "A" LPCI Loop was observed for depressurization. The system operated satisfactorily after the new check valve was installed.

A potential Part 21 Investigation was initiated on the failed check valve per DAP (Dresden Administrative Procedure) 02-22 to determine if the check valve failure was due to a manufacturing defect. It was later determined that the failure is not a 10 CFR Part 21 reportable.

The failed check valve was replaced with one of the same type and manufacturer for the following reasons:

1. The valve manufacturer (C & S Valve) has not reported any occurrences of this nature. The valve representative stated that this type of failure has not occurred previously.
2. The root cause is not believed to be system-induced (i.e. flow turbulence or cavitation).
3. The valve representative performed a test on the new check valves in the station storeroom, similar to a construction test. performed at the manufacturer site. The valve representative stated the rubber seats of both valves are satisfactory.
4. The new check valves are of a different batch number than that of the failed check valve.

In order to prevent this failure from recurring, in the approved lubricant/solvent list, which is put into each applicable work package, a note will be added which states Synasol is not to be used on Viton rubber (NTS# 249-180-92-17202)

Another check valve of the same type, size, manufacturer, and batch number is installed on the 3 "B" LPCI pump. Work request D14546 has been written to inspect this check valve, to ensure it does not fail as the counterpart on the "A" LPCI pump. This check valve (3-1501-63B) is the only other check valve of the same type, manufacturer, and size in service at Dresden.

Results from the inspection of the 3-1501-63B check valve will be included in the supplemental report (NTS # 249-180-92-17201).

F. PREVIOUS OCCURRENCES:

No previous occurrence of this type was found.

G. COMPONENT FAILURE DATA:

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model Number</u>	<u>Mfg. Part Number</u>
C & S Valve Co.	Check Valve	Dual Plate	90-1314-030-02

An industry wide NPRDS data base search revealed no failures of this type were found.