

LICENSEE EVENT REPORT (LER)

Form Rev. 2-0

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Title (4)

Unit 2 LPCI Inoperable due to 2D RHR Pump Discharge Check 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)																			
1	1	1	2	9	6	9	6	--	0	0	3	--	0	0	1	2	1	0	9	6			0	5	0	0	0		
OPERATING MODE (9)			1			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																							
POWER LEVEL 1001 (10)			1			20.402(b)			20.405(c)			50.73(a)(2)(iv)			73.71(b)														
						20.405(a)(1)(i)			50.36(c)(1)			X 50.73(a)(2)(v)			73.71(c)														
						20.405(a)(1)(ii)			50.36(c)(2)			50.73(a)(2)(vii)			Other (Specify in Abstract below and in Text)														
						20.405(a)(1)(iii)			50.73(a)(2)(i)			50.73(a)(2)(viii)(A)																	
						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	TELEPHONE NUMBER
Charles Peterson, Regulatory Affairs Manager, ext. 3602	AREA CODE 3 0 9 6 5 4 - 2 2 4 1

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										
X	B	O	S	C	V	-	A	5	8	5	Y								

SUPPLEMENTAL REPORT EXPECTED (14)

X YES (If yes, complete EXPECTED SUBMISSION DATE)	NO	Expected Submission Date (15)	Month	Day	Year			
			0	6	0	1	9	7

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

The Residual Heat Removal (RHR) Low Pressure Coolant Injection (LPCI) subsystem was declared inoperable on November 12, 1996 at 0345 hours due to the loss of water fill pressure to the discharge piping. The 2D RHR Pump Discharge Check Valve (DCV), 2-1001-67D, failed to close after the pump was shut off causing the discharge piping fill pressure to be lost. A LPCI system 7 day Limiting Condition of Operation (LCO) was entered.

The 2D RHR pump suction gate valve, MO 2-1001-7D, was closed to help regain fill to the LPCI subsystem. The 2D RHR pump was declared inoperable and a 30 day LCO was entered. The LPCI mode of RHR was declared operable when the discharge pipe was pressurized exiting the 7 day LCO at 0412. The 2C RHR pump was then started to reseal the DCV, 2-1001-67D. The MO 2-1001-7D was then reopened, and no change in discharge pressure was noted. The 2C RHR pump was shutdown and the fill remained on the LPCI subsystem indicating that the DCV was seated. The 2D RHR pump was declared operable and the 30 day LCO was exited at 0426 hours on November 12, 1996.

The cause of this event is the failure of the 2D RHR pump DCV to properly seat. The reason that the valve failed to seat has not been determined. A supplemental Licensee Event Report (LER) will be issued after a root cause for the valve failure has been determined. The 2D RHR pump DCV will be repaired as soon as possible but no later than the upcoming Q2R14 refueling outage scheduled for March 1997.

The consequences of this event are considered minimal. The fill pressure to the LPCI subsystem was restored within one hour and both loops of the Core Spray subsystem were operable during the event.

LER265/96/003.WPF

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

PLANT AND SYSTEM IDENTIFICATION:

General Electric - Boiling Water Reactor - 2511 Mwt rated core thermal power.

EVENT IDENTIFICATION: Unit 2 LPCI Inoperable due to 2D RHR Pump Discharge Check Valve Failure.

A. CONDITIONS PRIOR TO EVENT:

Unit: Two Event Date: November 12, 1996 Event Time: 0345
Reactor Mode: 1 Mode Name: Power Operation Power Level: 100%

This report was initiated by Licensee Event Report 265/96-003

Power Operation (1) - Mode switch in the RUN position with average reactor coolant temperature at any temperature.

B. DESCRIPTION OF EVENTS:

The 2D Residual Heat Removal (RHR) System [BO] Pump Discharge Check Valve (DCV) failed to close at 0345 hours on November 12, 1996, after the pump was shut off following a routine surveillance. This caused the Low Pressure Coolant Injection (LPCI) [BO] mode of RHR to be declared inoperable due to the loss of water fill pressure to the discharge piping. At 0915 hours the Operating Department determined that the loss of the LPCI subsystem constituted a loss of accident mitigation in accordance with 10CFR50.72(b)(2)(iii)(D). A Nuclear Regulatory Commission (NRC) 4 hour Emergency Notification System (ENS) notification was made at 1026 hours on November 12, 1996.

At 0345 hours a 7 day Limiting Condition of Operation (LCO) was entered in accordance with Technical Specification (TS) section 3.5.A, Action Statement 2.b. Both loops of the Core Spray subsystem [BM] were verified operable. The 2D RHR pump suction valve, MO 2-1001-7D, was closed to help regain fill to the RHR system. The 2D RHR pump was declared inoperable at this time and a 30 day LCO was entered in accordance with TS section 3.5.A, Action Statement 2.a.

Fill was returned to the LPCI subsystem per QCOP 1000-2, "Preparation for Standby Operation" procedure. The 7 day LCO for the loss of the LPCI subsystem was then exited. The 30 day LCO for the 2D RHR pump inoperable remained in effect. The 2C RHR pump was started to reseal the 2-1001-67D check valve. The 2D RHR pump's suction valve was then reopened, and no change in discharge pressure was noted. The 2C RHR pump was shutdown and the fill remained on the LPCI subsystem indicating that the 2D RHR pump DCV was seated. At 0426 hours, the 2D RHR pump was declared operable and the 30 day LCO was exited. Problem Identification Form (PIF) #96-3196 was written to document this event and to require an operability determination for the 2D RHR pump DCV. Work Request (NWR) #960051348 had been previously written and scheduled for the next refuel outage to inspect and repair the 2D RHR Pump DCV.

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The 2D RHR Pump DCV had previously failed to close causing a loss of fill to the LPCI subsystem on July 3, 1996. This event is documented in PIF #96-2261. At this time the DCV reseated itself after 32 minutes with no operator action and the fill was restored to the LPCI subsystem. The TSs in effect at the time of PIF #96-2261 did not require the LPCI subsystem to be declared inoperable immediately when the fill on the discharge piping was lost. Rather the TSs in effect at the time allowed for 12 hours to recover the pressure in the LPCI discharge piping prior to declaring the LPCI subsystem inoperable. Therefore the event which occurred in July 1996 was not reportable.

C. CAUSE OF EVENT:

The cause of this event is the failure of the 2D RHR pump DCV to properly seat. The reason that the valve failed to seat has not been determined. The valve will be repaired or replaced, during the upcoming refuel outage or sooner depending on the availability of a replacement valve. A supplemental Licensee Event Report (LER) will be issued after a root cause for the valve failure has been determined.

D. SAFETY ANALYSIS:

The consequences of this event are considered minimal. The fill pressure to the LPCI subsystem was restored within one hour and both loops of the Core Spray subsystem were operable during the event.

The nuclear safety related design function of the RHR System Pump DCVs is to open for LPCI and RHR Containment Cooling operation. They are also required to close to maintain the LPCI pump discharge lines full of water and to prevent pump backflow during system operation. In the standby mode they are required to close to permit the pump discharge piping to be maintained full of water by the Emergency Core Cooling System (ECCS) Keep Fill (KF) System [BM]. Non-safety related design functions include, opening to permit flow for the Shutdown Cooling (SDC)[BO] mode, Fuel Pool Cooling [DA] mode and either Reactor Pressure Vessel [AC] or suppression pool drain to radwaste [NH].

The design function requirement that failed during this event is the ability of the DCV to close during the Standby mode to permit the discharge piping to be maintained full of water by the ECCS Keep Fill System. The other functions of the check valves have been proven operable through recent surveillance's including the function to close to maintain the LPCI pump discharge lines full of water and to prevent pump backflow. This function was proven when the 2C RHR pump was started and the check valve closed preventing pump backflow.

Based on the following analysis, the intermittent failure of the 2D RHR pump DCV to close is not an operability concern for the LPCI subsystem.

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The DCV closes when another pump in the RHR system is operated. The 2D RHR pump DCV has been quantified as leaking 2.8 gpm when the 2C RHR pump is in operation. In May, 1996, with SDC operating using the 2C RHR pump, it was observed that suppression chamber level was slowly rising at a rate of 2.8 gpm over a period of 48 hours. Since the single ECCS KF pump has a capacity of 50 gpm, this amount of leakage through the 2D RHR pump DCV is not enough to prevent the design function of the DCV from being fulfilled in the standby mode. Also, the LPCI discharge piping fill pressure is continuously monitored by a pressure switch which causes a Control Room (CR) alarm if the pressure drops below 57 psig. Therefore, if the check valve fails open in the future, the CR operator would be immediately notified and the 2D RHR pump could be isolated to regain the operability of the LPCI subsystem. Therefore all design functions of this check valve are operable.

E. CORRECTIVE ACTIONS:

Corrective Actions Completed:

1. LPCI KF pressure was re-established within one hour.
2. The Operating Department has been directed through a standing order to ensure that the 2D RHR pump is not the last RHR pump to be shut off when using the system. This will prevent the check valve from failing to seat in the interim until the valve is repaired.
3. An operability determination was completed for PIF #96-3196 to ensure that the 2D RHR pump DCV was still operable despite experiencing intermittent failures.

Corrective Actions to be Completed:

1. The 2D RHR pump DCV will be repaired or replaced under NWR #960051348 during the next refuel outage (Q2R14) or sooner, depending on the availability of a replacement valve. This will be completed by June 1, 1997. (NTS #2651809600301, Mechanical Maintenance)
2. The work package for the DCV repair/replacement will be reviewed by the component engineer and hold points will be added as necessary to ensure that the root cause is determined for the valve failure. This will be completed by January 3, 1997. (NTS #2651809600302, Support Engineering)
3. The station has been experiencing a higher than expected rate of failure on these valves. The valve in question was replaced during the refuel outage in 1995. Therefore, the Component Engineer will analyze these failures and determine if additional corrective actions are necessary. This determination will be completed by June 1, 1997. (NTS #2651809600303, Support Engineering)
4. A supplemental LER will be submitted when the 2D RHR pump DCV has been removed and a cause for the failure determined. The supplemental LER will also address the failure of the previous corrective actions for this check valve failure. This will be completed by July 1, 1997. (NTS #2651806000304, System Engineering)

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F. PREVIOUS EVENTS:

A search was performed of the LER database for the last two years to determine if there have been similar check valve failures on Emergency Core Cooling Subsystems. No LERs have been written for ECCS check valves in the last two years.

However, several PIFS have documented failures on the RHR pump discharge check valves. These are listed below:

- PIF 94-2135 10/01/94 1C RHR Pump DCV failure
Valve replaced during LCO
Rubber seat not properly bonded onto valve.
- PIF 94-2433 11/19/94 2D RHR Pump DCV failed to seat
Valve replaced during refuel outage in 1995
Valve was binding due to excessive wear
- PIF 96-2261 07/03/96 2D RHR Pump DCV failed to seat
Work Request written to replace valve and operability determination written.

G. COMPONENT FAILURE DATA:

1. Component Description: RHR Pump Discharge Valve
Manufacturer/Type: C & S Inc. / 12" Dual Disc
Model Number: 30 SMF 402