Commonwealth Edison
Dresden Nuclear Power Station
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March 31, 1994

GFSLTR 94-104

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

Licensee Event Report 94-006, Docket 50-349 is being submitted as required by Technical Specification 6.6, NUREG 1022 and 10CFR50.73(a)(2)(ii).

Sincerely,

Gary R. Spedl
Station Manager
Dresden Station

GFS/JO'n/cfq

Enclosure

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

IE22 1/1

NRC FORM 366 (5-92) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

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.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Dresden 3	05000249	1 OF 4

TITLE (4)
Unit 3 HPCI Isolation Motor-Operated Valves Declared Inoperable Due to High Valve Factors

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	03	94	94	-- 006 --	00	03	31	94	None	
									FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	N
POWER LEVEL (10)	063

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

	20.402(b)		20.405(c)		50.73(a)(2)(iv)		73.71(b)
	20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)
	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)	X	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 (Include Area Code)
John O'Neill, Site Engineering, Ext. 2783	(815) 942-2920

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)			EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
	YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On March 3, 1994, at 1820 hours, with Unit 3 at 63% power, Dresden Site Engineering (SEC) informed the Operations Department of the potential inoperability of the High Pressure Coolant Injection (HPCI) Turbine Steam Supply inboard and outboard containment isolation motor-operated ,valves (MOVs) 3-2301-4 and 3-2301-5, respectively. This was a result of a review performed by SEC, of EPRI testing documentation in which various MOV configurations were subjected to high differential pressure (blowdown) conditions. SEC determined that the two HPCI MOVs would require greater thrust output than previously calculated to overcome valve internal frictional forces and perform their isolation safety function. Operations entered a 7-day Tech Spec LCO by closing both HPCI valves and declaring the HPCI system inoperable. These events resulted in Unit 3 being shutdown and commencing D3R13 refuel outage at 2040 on March 9, 1994 in accordance with Technical Specification 3.5.C. The safety significance of this event was considered minimal because of the ability of the MOVs to isolate steam line leaks and the low probability of a complete steam line rupture (blowdown condition). Operability Assessments were performed for the remainder of Unit 2 and 3 Blowdown MOVs. Corrective actions for the Unit 3 Blowdown MOVs include the implementation of upgrade modifications to the existing MOV configurations during the D3R13 outage. The Unit 2 Blowdown MOVs received these modifications during the D2R13 refuel outage (Winter 1993).

A. PLANT CONDITIONS PRIOR TO EVENT:

UNIT: 3 EVENT DATE: March 3, 1994 EVENT TIME: 1820

REACTOR MODE: N MODE NAME: Run POWER LEVEL: 63%

REACTOR COOLANT SYSTEM PRESSURE: 1000 psi

B. DESCRIPTION OF EVENT:

On March 3, 1994, at 1820 hours, with Unit 3 at 63% power, Dresden Site Engineering (SEC) issued a Problem Identification Form (PIF) to inform the Operations Department of the potential inoperability of the High Pressure Coolant Injection [BJ] (HPCI) Turbine Steam Supply inboard and outboard containment isolation motor-operated valves (MOVs), 3-2301-4 and 3-2301-5, respectively. This was a result of a review, performed by SEC, of EPRI testing documentation in which various MOV configurations were subjected to high differential pressure (blowdown) conditions. SEC determined that the two HPCI MOVs would require greater thrust output than previously calculated to overcome valve internal frictional forces (valve factor) and perform their isolation safety function. Operations entered a 7-day Technical Specification Limiting Condition for Operation (LCO) by closing both HPCI valves and declaring the HPCI system inoperable, an ENS phone notification was made at 1859, Central Standard Time, on March 3, 1994. These events resulted in Unit 3 being shutdown and commencing D3R13 refuel outage at 2040 on March 9, 1994 in accordance with Technical Specification 3.5.C., an ENS phone notification was made at 2042, Central Standard Time on March 9, 1994. The safety significance of this event was considered minimal because of the ability of the MOVs to isolate steam line leaks and the low probability of a complete steam line rupture (blowdown condition). Operability Assessments were performed for the remainder of Unit 2 and 3 Blowdown MOVs. Corrective actions for the Unit 3 Blowdown MOVs include the implementation of upgrade modifications to the existing MOV configurations during the D3R13 outage. The Unit 2 Blowdown MOVs received these modifications during the D2R13 refuel outage (Winter 1993).

C. CAUSE OF EVENT:

This report is being submitted in accordance with 10 CFR 50.73(a)(2)(ii)(B), which requires the reporting of any event or condition that results in the plant being outside of the design bases.

In 1989, the NRC issued GL 89-10 to address problems in the industry with MOVs. Subsequently, in 1990, the NRC issued GL 89-10 Supplement 3, to address the results of NRC sponsored tests of MOVs. These tests specifically addressed the performance of high pressure valves in a blowdown condition. Dresden reviewed GL 89-10 Supplement 3 and determined that it applied to containment isolation valves in the Reactor Water Cleanup [CE] (RWCU) system (1201-1, 1201-2), Isolation Condenser [BL] (ISCO) system (1301-1, 1301-2, 1301-3, 1301-4) and the HPCI system (2301-4, 2301-5). Responses were sent to the NRC addressing the status of these MOVs and the actions to be performed to correct any deficiencies. The Unit 2 Blowdown MOVs were modified during the D2R13 refuel

outage (Winter 1993). The Unit 3 Blowdown MOVs will be modified during the present refuel outage, D3R13.

MOVs are set up, based on calculation, to achieve a thrust value in order that the valve would be able to perform its design function. A major input to determine the required thrust for a valve is referred to as "valve factor". The valve factor represents the frictional forces which exist between the valve disk, guides and seating surfaces as the valve is cycled. The higher the valve factor the higher the thrust required to operate the valve.

EPRI performed testing on different types and manufacturers of valves. SEC, in conjunction with the Nuclear Engineering and Technology Services (NETS) department, evaluated the results of the EPRI testing and determined that the Crane type 783 carbon steel valve tested was similar to the HPCI blowdown valves (2301-4, 2301-5). The Crane valve which was tested was a 783 carbon steel valve, in which the wedge and the body guide are made of the same material. This construction of similar hardness (relatively soft) materials is believed to be the cause of the guide damage that was sustained during the EPRI blowdown test. This valve damage creates higher friction factors under blowdown conditions than were previously assumed. The valve factor for the Crane valve tested increased from 0.45 under ambient conditions to 0.85 under blowdown conditions. The Unit 3 valves, not being modified, were determined not capable of being able to develop the thrust required to close the valves under blowdown conditions and were declared inoperable. The Unit 2 valves were reviewed and because the MOVs received modifications were determined to be able to develop the required thrust to cease the blowdown condition. This was documented in an Operability Assessment by SEC (CHRON# 0300144).

The blowdown valves in the Unit 2 RWCU system and the Units 2&3 ISCO system are Crane 783 stainless steel valves. SEC's review also concluded that for Crane 783 stainless steel gate valves, the valve factors measured are higher than what has previously been used in MOV calculations. As no Crane 783 stainless steel valve was tested, but valves with similar materials were, it was by engineering judgement that a valve factor of 0.6 be used to bound the valves for blowdown service. Any actuator that could not generate thrust to overcome a 0.6 valve factor was further reviewed to determine its capabilities. The review of these valves was documented in an Operability Assessment by SEC (CHRON# 0300145) and all valves in these systems were found to be operable.

D. SAFETY ANALYSIS:

The HPCI subsystem is designed to pump water into the reactor vessel under those LOCA conditions which do not result in rapid depressurization of the reactor pressure vessel. The HPCI subsystem consists of a steam turbine driving a two-stage high pressure pump and a gear driven , single-stage booster pump. The turbine is supplied with steam from the reactor through a steam supply line, which includes two primary containment isolation valves, one inboard (2301-4) and one outboard (2301-5). Both valves are open during normal unit operations. MOVs 2301-4 and 2301-5 are required to close on a Primary Containment Group IV Isolation signal. The safety function of the HPCI containment isolation valves is to prevent the release of radioactive materials in excess of the limits in 10CFR100. These containment isolation valves are also designed to function

regardless of the failure of any single component and independent of other plant controls and instrumentation.

The Primary Containment Group IV Isolation signal is initiated on the following conditions:

* high HPCI Room area temperatures
* high steam line flow
* low steam line pressure

If a steam line leak was to occur in the HPCI Room, the area temperature monitors would initiate the isolation and the 2301-4 and 2301-5 would close. A steam leak of sufficient magnitude would also result in isolation on high steam line flow and the 2301-4 and 2301-5 would close. The EPRI testing indicates that the valve factor for the valves under leak conditions is lower, as valve guide damage does not occur. The valves under these conditions would be able to perform their design function. If a steam line rupture was to occur then the blowdown conditions would be present and the valves could possibly not close due to guide damage. In this event another valve downstream could be closed or the vessel pressure could be decreased, in accordance with Dresden Emergency Operating Procedures (DEOP), to decrease the forces across the valve disc. The reduction in the forces on the MOV would allow the torque switch to reset and the MOV would attempt to close. If the valves still did not close to isolate the blowdown, the operators would continue to follow the DEOPs until cold shutdown could be achieved. Since the valves could close to stop a leak in the steam line and the probability of a complete steam line break is low, the safety significance of this event is considered minimal.

E. CORRECTIVE ACTIONS:

The immediate corrective action was to close the 2301-4 and 2301-5 valves and declare the HPCI system inoperable. This was performed at 1830 hours on March 3, 1994. As repairs to the MOVs would require a primary containment entry, the unit was shutdown at 2040 on March 9, 1994, and refuel outage D3R13 was commenced.

During the present refuel outage the previously planned modifications to the actuators of MOVs 3-2301-4 and 3-2301-5 will be performed. Modifications to the valve internals are being reviewed and would also be performed during this refuel outage.

F. PREVIOUS OCCURRENCES:

None.

G. COMPONENT FAILURE DATA:

None.