

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Cooper Nuclear Station	DOCKET NUMBER (2) 05000298	PAGE (3) 1 OF 4
---	-------------------------------	--------------------

TITLE (4) Failure of One Core Spray System Suction Valve to Close During Surveillance Testing Due to Incorrectly Installed Motor Operator Pinion Gear

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	0	2	3	8	5	8	8	0	1	0	0	0	5	0	0	0

OPERATING MODE (9) N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11)										
	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)							
POWER LEVEL (10) 0, 0, 0	20.405(a)(1)(i)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)							
	20.405(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)							
	20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(vii)(A)								
	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)(ix)								

LICENSEE CONTACT FOR THIS LER (12)

NAME Donald L. Reeves, Jr.	TELEPHONE NUMBER AREA CODE: 4, 0, 2 4, 0, 2 8, 2, 5 - 3, 8, 1, 1
-------------------------------	--

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS
B	BIM	11814	L121010	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 October 23, 1985, during performance of Surveillance Procedure 6.3.4.2, Core Spray Motor Operated Valve Operability Test, Core Spray Suction Valve CS-MOV-M07B would not close when remotely actuated from the Control Room. The problem was immediately investigated and it was determined that though the motor would run, an apparent gear train problem existed since valve position did not change. It was further verified that the valve could be repositioned using the local manual handwheel. At the time of discovery of this condition, the plant was shutdown.

The cause of the operability problem was discovered to be due to incorrect pinion gear orientation in the motor operator, an SMB-0 operator manufactured by Limitorque Corporation. A new pinion gear was installed and related corrective actions were taken to restore the operator to a satisfactory condition. The operator was electrically reterminated, successfully stroke tested and returned to service.

Subsequently, as a followup to this event and as additional corrective action in response to IEIN 85-22, an inspection was conducted of all Limitorque SMB-0 through 4 operators installed in safety related applications to verify correct gear orientation. Two (2) additional valve operators were found with the pinion gear installed incorrectly and were subsequently disassembled, inspected, and reassembled correctly. Additionally, maintenance procedures were updated to insure correct pinion gear orientation during reassembly.

8805190003 880512
PDR ADOCK 05000298
S DCD

IE 22/11

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1) Cooper Nuclear Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 8	LER NUMBER (6)			PAGE (3)		
		YEAR 8 8	SEQUENTIAL NUMBER - 0 1 0	REVISION NUMBER - 0 0			
					0 2	OF 0 4	

TEXT (if more space is required, use additional NRC Form 365A (1/17))

A. Event Description

On October 23, 1985, during performance of Surveillance Procedure 6.3.4.2, Core Spray Motor Operated Valve Operability Test, Core Spray Suction Valve CS-MOV-MO7B would not close when remotely actuated from the Control Room. The problem was immediately investigated and it was determined that though the motor would run, an apparent gear train problem existed since valve position did not change. It was further verified that the valve could be repositioned using the local manual handwheel.

B. Plant Status

Shutdown from October 5, 1985 to November 23, 1985 due to an unplanned turbine outage.

C. Basis for Report

An event or condition that potentially jeopardized the ability to satisfactorily isolate primary containment, reportable in accordance with 10CFR50.73(a)(2)(ii). When this failure was identified, a technical evaluation was performed and the situation was not considered reportable since preferred valve position during both normal and post-accident conditions is OPEN, providing suction to Core Spray Pump B. However, subsequent to completion of an NRC Safety System Functional Inspection during which time this failure was reviewed, the situation was re-evaluated and re-assessed as being reportable.

D. Cause of Event

Design. The installation orientation (mounting position) of the motor pinion for Limitorque Corporation SMB-0 operators, the model number of the operator installed for CS MOV-MO7B, is required to be with the set screw closest to the motor flange (and gear teeth at the outboard end of the motor shaft), whereas, the pinion installation for SMB-1 through 4 operators, all of which are installed at CNS in other safety related applications, is just the reverse. This orientation difference could easily be overlooked during assembly. Additionally, the motor pinion can easily be installed in either orientation and, if installed incorrectly, would not be revealed during post-maintenance testing. While maintenance records indicate that the gear train for CS-MOV-MO7B was examined in 1977, it is not possible to determine if the pinion gear orientation was inadvertently changed (reversed) at that time. It is entirely possible that the pinion was incorrectly installed in the operator during original fabrication. Regardless of when the gear was incorrectly installed, the potential for doing so is viewed as a human factor design deficiency from the perspective of:

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

57 NAME (1) Cooper Nuclear Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 8 8 8				LER NUMBER (6)			PAGE (3)		
					YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	0 3	OF	0 4
					-- 0 1 0	-- 0 0	-- 0 0			

TEXT (if more space is required, use additional NRC Form 3054's) (17)

- a) The pinion gear mounting orientation for the SMB-0 operator is the reverse of the gear orientation for the SMB-1 through 4 operators, and
- b) No means are provided, mechanical or otherwise (except for procedural controls), to prevent gear installation in the reverse direction.

E. Safety Significance

CS-MOV-MO7B is the suction isolation valve from the Suppression Pool (Torus) for the "B" Core Spray pump. It is a normally open, remote-manual valve which is operated via a keylock switch in the Control Room. As specified in the CNS USAR, the Core Spray Suction Valves are classified as Category B-X containment isolation valves, the "X" indicating, essentially, that it is a dual function valve (i.e., they provide containment isolation, as well as emergency core cooling functions). In determining the safety significance of the associated failure modes and effects, the following design parameters are pertinent:

- a) The design pressure of the Drywell and Torus is 62 psig.
- b) The design pressure of the Core Spray suction piping from the Torus is 150 psig.
- c) The design pressure of the Core Spray discharge piping which returns to the vessel through Drywell penetrations is 500 psig.

CS-MOV-MO7B would typically be closed only for maintenance purposes and for periodic surveillance testing. Should it fail in the closed position, the "B" train of Core Spray would be considered inoperable and the pertinent Technical Specification Limiting Condition for Operation (LCO) would be followed. Should an accident occur during this time period, Core Spray subsystem A and both LPCI subsystems would be available. Should the valve fail when open, as it did in this case, operation of the Core Spray System would be unaffected. However, if during operation of the Core Spray System, the piping (or pump seal) were to fail with the valve failed open, primary containment isolation could still be achieved by dispatching an Operator to either close the valve locally, or close the stream manual valve.

The previously identified design parameters reflect a substantial margin to failure for the Core Spray piping and Core Spray pump components. Rupture of the piping or catastrophic failure of the pump seal is not considered to be credible concurrent with the most severe containment pressurization transient.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		0 5 0 0 0 2 9 8 8 8	- 0 1 0	- 0 0	0 4	OF

Cooper Nuclear Station

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

F. Corrective Action

Inspection of the motor operator revealed that several pinion gear teeth were lost, abnormal gear wear was evident and the pinion gear was installed in the reverse direction. A new pinion gear was installed and related corrective actions were taken to restore the operator to a satisfactory condition. The operator was electrically reterminated, successfully stroke tested and returned to service.

Subsequently, as a followup to this event and as additional corrective action taken in response to IEIN 85-22, "Failure of Limitorque Motor - Operated Valves Resulting from Incorrect Installation of Pinion Gear", an inspection was conducted of all SMB 0, 1, 2, 3, and 4 operators installed in safety related applications to verify correct pinion gear orientation. Two (2) additional valve operators were found with the pinion gear installed incorrectly and were subsequently disassembled, inspected and reassembled correctly. These valves were:

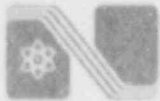
HPCI-MOV-MO24 - Emergency Condensate Storage Tank (ECST) Test Line Shutoff Valve

RHR-MOV-MO17 - Shutdown Cooling RHR Supply Outboard Valve.

Additionally, a QC checkpoint was added to the appropriate Maintenance Procedure to provide for independent verification of pinion gear orientation and a NOTE in the procedure regarding correct pinion gear installation orientation was reworded as a CAUTION.

G. Past Similar Events

None. The initial evaluation conducted in response to IEIN 85-22, which was completed in July 1985, indicated that CNS had not experienced any failures of this nature. Other than this one operational deficiency, no other failures of this nature have occurred.



Nebraska Public Power District

COOPER NUCLEAR STATION
P.O. BOX 98, BROWNVILLE, NEBRASKA 68321
TELEPHONE (402) 825-3811

CNSS880240

May 12, 1988

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

Gentlemen:

Cooper Nuclear Station Licensee Event Report 88-010 is forwarded as an attachment to this letter.

Sincerely,

A handwritten signature in cursive script that reads "J. M. Meacham".

J. M. Meacham
Acting Division Manager of
Nuclear Operations

JMM:ya

Attachments

cc: R. D. Martin
L. G. Kunc1
K. C. Walden
M. Kuta
R. J. Singer
INPO Records Center
ANI Library
NRC Resident Inspector

IF22
11