



## Nebraska Public Power District

COOPER NUCLEAR STATION  
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NLS960071

April 17, 1996

U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555-0001

Dear Sir:

Cooper Nuclear Station Licensee Event Report 96-002 is forwarded as an attachment to this letter.

Sincerely,



J. T. Herron  
Plant Manager

/wrv

Attachment

cc: Regional Administrator  
USNRC - Region IV

Senior Project Manager  
USNRC - NRR Project Directorate IV-1

Senior Resident Inspector  
USNRC- Cooper Nuclear Station

NPG Distribution

INPO Records Center

W. Turnbull  
MidAmerica Energy

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*Handwritten initials/signature*

<b>NRC FORM 366</b> <small>(4-95)</small>		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		<b>APPROVED BY OMB NO. 3150-0104</b> <b>EXPIRES 04/30/98</b> <small>ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), 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.</small>																												
<b>LICENSEE EVENT REPORT (LER)</b> (See reverse for required number of digits/characters for each block)																																
<b>FACILITY NAME (1)</b> COOPER NUCLEAR STATION				<b>DOCKET NUMBER (2)</b> 05000298		<b>PAGE (3)</b> 1 OF 3																										
<b>TITLE (4)</b> Unassured Past Operability of Core Spray Subsystem A Due to Susceptibility of Injection Valve to Pressure Locking.																																
<b>EVENT DATE (5)</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>MONTH</th> <th>DAY</th> <th>YEAR</th> </tr> <tr> <td>03</td> <td>22</td> <td>96</td> </tr> </table>			MONTH	DAY	YEAR	03	22	96	<b>LER NUMBER (6)</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>YEAR</th> <th>SEQUENTIAL NUMBER</th> <th>REVISION NUMBER</th> </tr> <tr> <td>96</td> <td>002</td> <td>00</td> </tr> </table>		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	96	002	00	<b>REPORT DATE (7)</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>MONTH</th> <th>DAY</th> <th>YEAR</th> </tr> <tr> <td>04</td> <td>17</td> <td>96</td> </tr> </table>		MONTH	DAY	YEAR	04	17	96	<b>OTHER FACILITIES INVOLVED (8)</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>FACILITY NAME</th> <th>DOCKET NUMBER</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>FACILITY NAME</td> <td>DOCKET NUMBER</td> </tr> </table>		FACILITY NAME	DOCKET NUMBER			FACILITY NAME	DOCKET NUMBER
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<b>POWER LEVEL (10)</b> 100		20.2201(b)		20.2203(a)(2)(v)		X	50.73(a)(2)(i)	50.73(a)(2)(viii)																								
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20.2203(a)(2)(iv)		50.36(c)(2)			50.73(a)(2)(vii)																											
<b>LICENSEE CONTACT FOR THIS LER (12)</b>																																
<b>NAME</b> William R. Victor, Licensing and Compliance Specialist						<b>TELEPHONE NUMBER (Include Area Code)</b> (402) 825-3811																										
<b>COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)</b>																																
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<b>YES</b> (If yes, complete EXPECTED SUBMISSION DATE).				X <b>NO</b>																												
<b>ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)</b>																																
<p>On March 22, 1996, it was established that the Core Spray Subsystem A Injection Valve (CS-MOV-M012A) had been analytically incapable of performing its required opening function under certain accident conditions due to its susceptibility to the phenomenon of motor-operated gate valve pressure locking. As a result, the past operability of Core Spray Subsystem A could not be assured, contrary to the requirements of the Cooper Nuclear Station (CNS) Technical Specifications.</p> <p>The cause of this condition is attributable to original design error [NUREG-1022 CAUSE CODE B]. Pressure locking has evolved as a generic industry issue that was not recognized at the time of original plant design and licensing. Corrective action has been taken to modify the gate valve reactor side of the disc to ensure that pressure locking will no longer occur. The other safety-related motor-operated valves (MOVs) that could potentially experience pressure locking have been assessed and actions have been taken, as needed, to preclude their susceptibility. Follow-on evaluations are being performed to ascertain the effects of pressure locking on the past operability of those susceptible MOVs for which corrective action had been taken.</p>																																

LICENSEE EVENT REPORT (LER)  
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL	REVISION	
COOPER NUCLEAR STATION	05000298	96	-- 002	-- 00	2 OF 3

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

PLANT STATUS

The plant was at 100% power at the time the past operability assessment was concluded.

EVENT DESCRIPTION

Cooper Nuclear Station (CNS) Technical Specification (TS) 3.5.A.1 requires that both Core Spray [EIIIS: BM] subsystems be operable when there is irradiated fuel in the reactor vessel [RPV] and when reactor vessel pressure exceeds atmospheric pressure. On March 22, 1996, it was concluded that CS-MOV-MO12A [INV] had been analytically incapable of performing its required opening function prior to its modification during the RE16 refueling due to the effects of pressure locking. Background information on the pressure locking phenomenon itself and its emergence as an industry issue can be found in AEOD/S92-07, "Special Study- Pressure Locking and Thermal Binding of Gate Valves," dated December 1992. The calculated inability of CS-MOV-MO12A to open during certain accident conditions would have caused the operability of Core Spray Subsystem A to be unassured for periods of time that exceeded the time allowed in the CNS Technical Specifications.

The following is a brief chronology of the issue:

- 9/92 As a result of investigations into the plant-specific applicability of IE Notice 92-026, "Pressure Locking of Motor-Operated Flexible Wedge Gate Valves," CNS Engineering determined that several MOVs including CS-MOV-MO12A/B were potentially susceptible to this phenomenon.
- 3/93 An Engineering calculation based in part on generic CNS MOV data was performed which discussed the actual susceptibility of the above valves to pressure locking. This calculation indicated that CS-MOV-MO12A/B were not susceptible. Nevertheless, CS-MOV-MO12A/B were later scheduled to be modified during the subsequent refueling outage to eliminate the reliance on analytical means in demonstrating operability.
- 4/93 GL 89-10 testing was performed on CS-MOV-MO12A. At the time, the results did not disprove the MOV's presumed operability as concluded previously by the generic testing data (however, it was later recognized that the results had been misinterpreted).
- RE16 Testing of CS-MOV-MO12A was performed prior to its planned modification. The MOV was then modified as planned. The operability of this MOV was now assured without the need of analyses to account for the effects of the pressure locking.
- 1/96 In comparing the CS-MOV-MO12A as-found data with the previous April 1993 data, it was recognized that aspects of the April 1993 testing results had been misinterpreted. Efforts were initiated to assess past operability of this MOV using the RE16 data.

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		YEA	SEQUENTIAL	REVISI	
COOPER NUCLEAR STATION	05000298	96	-- 002	-- 00	3 OF 3

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EVENT DESCRIPTION (continued)

3/96 The past operability assessment of CS-MOV-MO12A concluded that the valve would have been operable under design basis accident conditions (a loss-of-coolant accident (LOCA) concurrent with loss-of-offsite power (LOOP)). However, when assuming the worst case degraded voltage conditions occurring on the electrical grid when a LOOP is not postulated, the valve generated insufficient torque to overcome the combination of bonnet pressurization effects and disc seating forces. Therefore, operability was not certain prior to its modification.

SAFETY SIGNIFICANCE

Core Spray Subsystem A is one of four low pressure ECCS subsystems that are designed to collectively mitigate design basis Loss-of-Coolant Accidents (LOCAs). With the past operability of Core Spray Subsystem A unassured, redundancy had been provided by the remaining three subsystems. With respect to the past functionality of CS-MOV-MO12A, an analytical failure could have occurred only after a combination of unlikely circumstances (an undetected full bonnet pressurization followed by a large break LOCA with degraded offsite electrical grid voltage). For these reasons, the safety significance of this previous condition is considered to be low.

CAUSE

A thermal-hydraulic explanation of the phenomenon of pressure locking is provided in AEOD/S92-07. The susceptibility of flexible wedge motor-operated gate valves to pressure locking was not a known phenomenon during the design and licensing of CNS. Accordingly, the cause of this condition is due to original design error.

CORRECTIVE ACTION

The following actions either have been or are being taken to correct pressure locking susceptibility concerns:

1. CS-MOV-MO12A was modified during RE16 by drilling an orifice through the reactor side of the valve disc, thereby providing a bonnet vent path. This prevention methodology was endorsed by AEOD/S92-07.
2. Other safety-related valves that were characterized as having potential susceptibility for pressure locking have been addressed (most recently per Generic Letter 95-07). Valve modifications and/or system reconfigurations have been made, as needed, to resolve pressure locking susceptibility at CNS.
3. A determination is being made if any other susceptible MOVs would have experienced a similar analytical loss of functionality prior to implementation of corrective action.

SIMILAR EVENTS

LER 92-011 Inoperability of Thermo-lag Barriers Based Upon the Results of Testing Reported In NRC Bulletin 92-01.

Correspondence No: NLS960071

The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Licensing Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
A determination is being made if any other susceptible MOVs would have experienced a similar analytical loss of functionality prior to implementation of corrective action.	None