



Nebraska Public Power District

COOPER NUCLEAR STATION
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TELEPHONE (402) 825-3811

CNSS948041

February 3, 1994

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

Dear Sir:

Cooper Nuclear Station Licensee Event Report 93-025, Revision 1, is forwarded as an attachment to this letter.

Sincerely,

R. L. Gardner
Plant Manager

RLG/nc

Attachment

cc: L. J. Callan
G. R. Horn
J. M. Meacham
R. E. Wilbur
V. L. Wolstenholm
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Cooper Nuclear Station	DOCKET NUMBER (2) 0 5 0 0 0 2 9 8	PAGE (3) 1 OF 0 14
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TITLE (4)
Hydrogen/Oxygen Monitoring System Operability Concerns Due to Moisture Accumulation And Sample Pump Reliability

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	
06	18	93	93	025	01				DOCKET NUMBER(S) 0 5 0 0 0	

OPERATING MODE (9) **N**

POWER LEVEL (10) **0 | 0 | 0**

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

<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.406(e)	<input type="checkbox"/> 50.73(e)(2)(iv)	<input type="checkbox"/> 73.71(b)
<input type="checkbox"/> 20.406(a)(1)(i)	<input type="checkbox"/> 50.38(e)(1)	<input type="checkbox"/> 50.73(e)(2)(v)	<input type="checkbox"/> 73.71(e)
<input type="checkbox"/> 20.406(a)(1)(ii)	<input type="checkbox"/> 50.38(e)(2)	<input type="checkbox"/> 50.73(e)(2)(vii)	OTHER (Specify in Abstract, below and in Text, NRC Form 366A)
<input type="checkbox"/> 20.406(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(e)(2)(viii)(A)	
<input type="checkbox"/> 20.406(a)(1)(iv)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(e)(2)(viii)(B)	
<input type="checkbox"/> 20.406(a)(1)(v)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(e)(2)(ix)	

LICENSEE CONTACT FOR THIS LER (12)

NAME John R. Myers	TELEPHONE NUMBER
	AREA CODE: 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 NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS
B	I	K	P	W 1 B 5	N				

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 June 18, 1993, upon a review of past operational data, it was determined that the Hydrogen/Oxygen Monitoring (H2/O2) system may have been installed and maintained in a manner which potentially prevented it from effectively performing its post-accident monitoring functions. The H2/O2 system was installed in 1988. Occasional problems with moisture accumulation and degraded sample pump operation were noted. Inspection of the sample lines indicated that portions were installed without sufficient slope to properly drain condensate out of the lines. The sample line slope was modified in 1990 and again in 1993. To eliminate what was thought to be foreign particles which affected sample pump reliability, filters were installed in 1990. The filters were subsequently found to exacerbate condensation formation. To correct this problem, the filters were periodically removed, disassembled and the condensate dumped from the filter bowls.

Based on a later laboratory analysis which indicated that the pump failures were due to normal operation, and not external contaminants, the filters were removed and the pump internals upgraded in 1993. Extensive testing was conducted to verify that condensation would adequately drain from the system. In January 1994 additional modifications were made to the pumps to provide added assurance of their operability. An evaluation of H2/O2 system operability during past operating cycles, considering the effects of the conditions noted above, has concluded that the analyzers were inoperable due to the moisture intrusion problem since the filters could not have been removed and the condensate dumped in a post-LOCA environment.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

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

A. Event Description

During the course of an NRC inspection, operability of the H2/O2 system in accordance with Technical Specification requirements specified in Table 3.2.H and design basis requirements specified in Section V.2.3.9 of the USAR, was questioned. The H2/O2 system was installed in April 1988 and subsequent operation revealed two problem areas associated with the system design.

The first area involved moisture accumulation in the sample lines which resulted in a reduction in sample flow and caused the analyzers to occasionally malfunction. Inspection of the sample lines indicated that portions were installed without sufficient slope from the containment to the analyzer cabinets to allow proper drainage of condensate out of the lines.

The second area involved failures of the sample pumps. Discussions with the vendor and a failure analysis performed by the vendor indicated that foreign particle contamination in the pumps was the likely cause, and that particulate filters should be installed.

A design change was implemented in April 1990 to modify the sample line slope and install particulate filters designed and manufactured by the H2/O2 system vendor in the suction lines of the sample pumps. Approximately one month later, the analyzer indication in the control room began to give erratic readings. An evaluation at that time found that the filters were acting as condensate traps reducing sample flow to the analyzers. While the filter installation assured the sample streams to the analyzer pumps to be free of particulate contamination, the filter housings acted as moisture traps, accumulating condensation from the sample as well as drainage that accumulated in portions of the sample lines due to slope deficiencies which still existed. In response to this problem, periodic Maintenance Work Requests were issued to remove and disassemble the filter, dump the condensate from the filter bowl, and return the filter to service.

It was subsequently determined that the filter installation did not correct the cause of the sample pump failures. In July 1992, plant engineers completed independent testing and concluded that the failures were due to internal pump degradation, as opposed to foreign particle contamination. At this time it was decided to initiate another design change to remove the filters and modify the pumps during the 1993 Refueling Outage.

B. Plant Status

At the time of discovery, the plant was in cold shutdown, in the 1993 Refueling Outage. During the period of time this condition existed, plant operation ranged from shutdown to 100 percent power.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20585, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

C. Basis for Report

The Technical Specifications require that the H2/O2 system be operable for monitoring post-accident conditions. On June 18, 1993, the condition was documented as a potential violation of Technical Specifications. Further evaluation since that time has concluded that the analyzers were inoperable during the period the filters were installed. Therefore, this event is being reported as a condition prohibited by Technical Specifications, in accordance with the criteria prescribed by 10CFR50.73(a)(2)(i).

D. Cause

This condition was caused by a design deficiency. The original design failed to adequately address moisture accumulation in the sample lines and the pump design was less than adequate.

E. Safety Significance

The H2/O2 system provides continuous post-accident monitoring of hydrogen and oxygen for the ranges that may exist during the extreme conditions postulated to occur during and after some accidents. Depending on the severity and duration of an accident, the condition of the H2/O2 system at the time of an accident, the effectiveness of the heat tracing, and the availability of the redundant analyzer, adequate hydrogen and oxygen monitoring may not have been available. Under these circumstances, however, the Post Accident Sampling System would have provided a means to manually obtain containment atmosphere samples for analysis.

F. Safety Implications

Requirements for post accident hydrogen monitoring are based on a postulated accident which exceeds the original design basis of the plant. Hydrogen and oxygen concentrations are controlled during normal operation and following design basis accidents with the Nitrogen Inerting and Standby Nitrogen Injection systems.

G. Corrective Action

It has been determined that the interim corrective action taken at the time the filters were found to collect condensation was inadequate. Consideration was not given to the fact that periodic entry to the Reactor Building to drain moisture from the filter bowls could be precluded due to radiological conditions under the postulated accident scenario.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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

G. Corrective Action - continued

A design change was implemented during the 1993 refueling outage which included: 1) removal of the particulate filters which were acting as moisture traps, 2) modification of sample line supports to ensure proper slope of the lines, 3) installation of a new and improved pump head and valve design, and 4) addition of an interlock between the heat trace logic and the pump control logic assuring heat trace functionality during pump operation.

Following this design change, extensive post-modification testing was conducted on the H2/O2 system to verify that the previous problems with moisture accumulation in the sample lines had been resolved. To further ensure the effectiveness of the system upgrade, an enhanced surveillance program was implemented during the initial stages of power operation following the recent refueling outage. However, pump performance problems continued to exist, and additional modifications were implemented in January 1994. These modifications included a return to the original pump and valve design and reorientation of the pumps to ensure even wear of the pump valves.

Pump monitoring will be continued at an increased frequency until assurance of their desired performance is obtained. In addition, preventive maintenance has been established at a frequency adequate to ensure pump operability for the required period.

H. Similar Events

None.