Nebraska Public Power District

COOPER NUCLEAR STATION
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CNSS810280

May 14, 1981

Mr. K. V. Seyfrit, Director
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region IV
611 Ryan Plaza Drive
Suite 1000
Arlington, Texas 76011

Dear Sir:

This report is submitted in accordance with Section 6.7.2.B.2 of the Technical Specifications for Cooper Nuclear Station and discusses a reportable occurrence that was discovered on April 14, 1981. A licensee event report form is also enclosed.

Report No.: 50-298-81-06
Report Date: May 14, 1981
Occurrence Date: April 14, 1981
Facility: Cooper Nuclear Station
Brownville, Nebraska 68321

Identification of Occurrence:
Conditions leading to operation in a degraded mode permitted by a limiting condition for operation as delineated in IE Bulletin 80-17.

Conditions Prior to Occurrence:
Steady state power operation at approximately 91% reactor power.

Description of Occurrence:
During routine surveillance testing of the Scram Discharge Header Constant Monitoring System three of the four installed monitors failed to function properly. A subsequent failure is also described in the analysis of this occurrence.

Designation of Apparent Cause of Occurrence:
The Constant Monitoring System is an ultrasonic level measurement device for determination of water level in the Scram Discharge Header. The apparent cause of the occurrence is component failure. The manufacturer has stated a marginal group of 1 MHz crystals had been installed in the transmitter. These same crystals turned up defective in their commercial line of flow devices that uses similar circuit design.

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Analysis of Occurrence:

The Constant Monitoring System is an ultrasonic measurement device that detects water in the Scram Discharge Headers. The system consists of four channels, two per discharge header. Any one of the four transducers will initiate a common annunciator in the Control Room and start a SDV level recorder. This system is backed up by a single float type level switch on each header. The float type level switches have respective annunciators in the Control Room. In the event either Scram Discharger Header fails to drain properly or fills without being detected by the Scram Discharge Instrument Volume, these instruments will detect the loss of free volume to allow sufficient time for full scram capability. Failure of these instruments to function could allow the Scram Discharge Header to fill undetected, thus preventing a full scram.

Subsequent to repairs made to the CMS on April 16, 1981, the reactor was manually scrammed in preparation for a refueling outage on April 21, 1981. At this time, two of four channels and one float level switch failed to detect water level. However, two of three Control Room annunciators alarmed and the SDV level recorder started. The two channels that did detect the scram properly were on the header furthest from the instrument volume. The float level suction on this header did not function properly. The float switch that worked properly was on the other header where both channels of the CMS failed. This float switch failure is related to the rate of filling of the SDV header. When the SDV header fills rapidly, the float switch does not respond. During subsequent filling operations at slow rates, the float switches operated properly. The apparent cause of the two channels not responding during the scram was a bonding problem in the transducer itself and a logic problem in the circuit board. This bonding problem was not identified during the initial surveillance testing on April 14, 1981.

This event presented no adverse consequences from the standpoint of public health and safety.

Corrective Action:

In response to the initial failure, air testing of the SDV header was initiated each eight hours. The discrepant crystals were changed out in all circuit boards and crystals of another vendor were selected by the designer of the CMS.

Subsequent to the second failure following the scram, a bonding problem was identified within the transducer. The original construction of the transducers had five bonds from the piezo material to the pipe. The transducers were redesigned, eliminating three of the bonding surfaces and the bonding epoxy was changed to one having a greater resistance to high temperature. The bonding agent is now rated in excess of the system design temperature. In addition, there are now four installed spares that can be utilized should another transducer failure occur. The logic was modified to raise the setpoint to 2" rather than 1½". This provides better reliability and does not change the operator actions as previously submitted to the NRC. Testing required by IE Bulletin 80-17, Supplement 4, except for full scram testing, will be completed prior to start-up.

Sincerely,

L. C. Lessor
Station Superintendent
Cooper Nuclear Station

LCL:cg
Attach.