

Nebraska Public Power District

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

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Ser Level Transmitters. Cooper Nuclear Station NRC ket No. 50-298, DPR-46.

This letter is advise you of a change in the District's plan to replace the Ch mechanical water level equipment with analog transmitters during the 1988 refueling outage. Specifically, the District has evaluated the CNS mechanical level equipment and determined it to be of very high reliability. On this basis, the District believes that our resources would be better utilized in making other safety related improvements and deferring the replacement of the water level instrumentation indefinitely. The District will, of course, monitor the use of Analog Transmitter/Trip Systems throughout the industry and the behavior of the CNS level instrumentation. Should we see evidence that a change would provide a safety significant or cost effective improvement, we would modify our plans, accordingly.

Discussion

Generic Letter 84-23 required BWR licensees to make plans to implement specific improvements in water level measurement. One of these was:

"Review of plant experience relating to mechanical level indication equipment. Plant experience shows mechanical level equipment is more vulnerable to failure or malfunction than analog equipment. A number of plants have already connected analog trip units to their level transmitters to improve reliability and accuracy. Those plants that use mechanical level indication should replace the mechanical level indication equipment with analog level transmitters unless operating experience confirms high reliability."

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In December 1984, the District responded to GL84-23, stating that:

"Experience at Cooper Nuclear Station indicates that the mechanical level equipment performs its function in a highly reliable manner; however, for various reasons, it is the District's intent to install analog equipment. This modification is projected to take place two refueling outages after the present outage. . ."

Since that time a large number of plant improvement modifications have been added to the CNS plans. As a result, the relative importance of the "various reasons' for installation of analog equipment has declined. The District, therefore, decided to reevaluate the decision to replace the CNS water level instrumentation.

A review of all Non-Conformance Reports (NCR's) involving water level instrumention occurring from 1981 through 1986 was undertaken. For this six-year period, only thirteen NCR's, identifying fourteen problems, were identified (see Table 1). Of the fourteen, seven were minor setpoint drift problems which would at worst, have resulted only in delayed trip; one was a deficient surveillance procedure which had no effect on system operation; one was a maintenance mistake which was easily detected and corrected before startup; one was arcing between contacts due to use of improper cleaning solvent and resulted only in a false annunciator alarm.

Of the remainder, one was a failure to trip. In this case the redundant component in that trip system was operable. Had this redundant component also failed, the Automatic Depressurization System would have been unavailable. Even in the unlikely event of loss of ADS plus all high-pressure makeup, the capability for manual depressurization would have been available. All Control Room level indicators remained operable and the existing operating procedures would have guided the operator in performing the manual depressurization.

One problem involved unexplained oscillations of the level indication in the Control Room. The redundant indicator was operable and the oscillations cleared during the trouble shooting procedure. This problem has not reoccurred.

The other two problems both involved switch LIS-101B (High) and occurred in a short time frame (September 1983 through January 1984). This switch was replaced in January 1984, and review of the monthly functional tests (CNS Technical Specification Table 4.2.B, page 4) since that time indicate that there have been no further recurrences. It is believed that both these problems were the result of a single defective switch. U.S. Nuclear Regulatory Commission Page 3 July 6, 1987

Among the fourteen recorded only one would have caused the loss of necessary water level information to the operator. In this case the redundant instrument remained functional.

A comparison of Cooper's mechanical level instrumentation was made against comparable industry mechanical level device and analog performance. Industry data was obtained from the Nuclear Plant Reliability Data System (NPRDS). A statistical analysis was performed to compare the various failure and unavailability rates to compare how the instruments at Cooper compare with the rest of the industry. The attached analysis concludes that the failure rate at Cooper is comparable to the industry norm for mechanical devices while the effective repair practices at Cooper provide unavailability rates comparable to that of analog devices.

Based on the results of this review, the District has concluded that the CNS water level instrumentation has a high reliability and can be expected to perform its functions as necessary. The District, therefore, intends to defer replacement of this equipment until such time as a safety significant or cost effective benefit can be demonstrated for CNS. Your concurrence is requested within 45 days of the date of this submittal.

Should you have any questions or require additional information, please call.

Sincerely,

Division Manager - Nuclear Support

GAT/grs:dm2/2(D5D) Attachment

cc: U.S. Nuclear Regulatory Commission Regional Office Region IV

NRC Senior Resident Inspector Cooper Nuclear Station TABLE 1 - NCR'S INVOLVING WATER LEVEL INSTRUMENTATION MALFUNCTIONS - 1981 THROUGH 1986

PROBLEM	POTENTIAL CONSEQUENCES
LIS-101A(Hi), Setpoint Drift.	101A and C(Hi) control RCIC auto shutoff, 1 of 2 once logic. 101C was functional. Had 101C failed, 101A would have functioned but at a higher level indication. No effect on level indication.
LI3-101D(Lo), Trip ½" low due to bent arm, excessive friction.	101A, B, C, D (Lo) - scram, 1 of 2 twice logic. Redundant component (101B) was functional, had 101B failed 101D would have tripped at 12.25." No effect on level indication.
LIS-101A and 101B(Lo), Trip at 10.7."	101A, B, C, D(Lo) - scram, 1 of 2 twice logic. Redundant components (101C and D) in each trip system were functional. Had 101C(or D) failed, 101A(or B) would have tripped but at 1.8 inches lower level. No effect on level indication.
LIS-101D(Lo), Erratic Trip Setpoint (1 event) and LIS-101B(Lo), Setpoint Drift (2 events).	101A, B, C, D(Lo) - scram, 1 of 2 twice logic. Redundant component in trip system was functional. Erratic component would have tripped at some point. No effect on level indication.
LIS-101B(Hi) Setpoint Drift.	LIS-101B and D(Hi) control HPCI auto shutoff, 1 of 2 once logic. 101D was functional. Had 101D failed, 101B would have functioned at a higher level. No effect on level indication.
Surveillance Procedure Glitch.	None.
LIS-101B(Hi), Leads Reversed.	LIS-101B and D(Hi) control auto HPCI Shutoff, 1 of 2 once logic. Redundant channel was functional. No effect on level indication.
LIS-72C, Switch 4 Arcing.	72-A, B, C, D, switches 4 are part of the RCIC auto initiation, 1 of 2 twice logic. Increased probability of inadvertent RCIC initiation. No effect on level indication (did give false annunciator alarm).
LIS-72C, Switch 2, Failed to Trip.	LIS-72C, switch 2 is part of the ADS permissive, 1 of 2 twice logic. Redundant component (LIS-72A) was functional. No effect on level indication.
LI-85B, Unexplained Oscillations	LI-85A, B provide level indication in Control Room. LI-85A was operable. Ambiguous level indication.
LIS-101B(Hi), Did Not Reset. (2 Events)	LIS-101B and D(Hi) control auto HPCI shutoff, 1 of 2 once logic. Should reset when High level clears to allow restart of HPCI. HPCI not available. Redundant ECC systems not affected. Switch replaced after second event. No effect on level indication.

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