



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

MONTICELLO NUCLEAR GENERATING PLANT

NORTHERN STATES POWER COMPANY

PLANT MODIFICATIONS IMPLEMENTED IN RESPONSE TO ITEM II.K.3.15 OF NUREG-0737

"SPURIOUS ISOLATION OF HPCI/RCIC"

Requirement as Stated in NUREG-0737

In many boiling water reactor plants the high-pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) systems use differential pressure sensors on elbow taps in the steam lines to their turbine drives to detect and isolate pipe breaks in the systems. The pipe break detection circuitry has resulted in spurious isolation of the HPCI and RCIC systems due to the pressure spike which accompanies startup of the systems. The pipe-break-detection circuitry should be modified so that pressure spikes resulting from HPCI and RCIC system initiation will not cause inadvertent system isolation.

Evaluation of Modifications

The purpose of this item was to eliminate spurious isolations which occur as a result of pressure spikes in the startup transients for HPCI and RCIC systems. The BWR Owners' Group proposed a modification consisting of installing a time delay relay in the isolation logic for HPCI and RCIC. The time delays chosen by the utilities adopting this approach range from three to seven seconds. Northern States Power Company chose to protect the RCIC system at Monticello from spurious trips by this method.

Tests of the installed relay at the plants using the time delay relays have shown that a three second delay is sufficient to prevent spurious isolation. Delay times up to thirteen seconds could be allowed without violating the design bases for the HPCI/RCIC isolation systems. This is because the design bases assume that the DC power isolation valve fails and that no offsite AC power is available to the AC valve. The diesel-generator start and emergency bus loading sequence is assumed to require thirteen seconds. Therefore, a time delay of three to seven seconds is acceptable.

The HPCI system at Monticello is protected from spurious trips on system start-up by break detection logic which uses a venturi installed in the steam line. Experience from automatic initiation and cold quick start tests of the HPCI system have shown that the logic utilizing the venturi flow measurements does prevent spurious isolations. Therefore, break detection logic of the HPCI system at Monticello meets the guidance of TMI Item II.K.3.15.

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