

ILLINOIS POWER

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April 26, 1991

10CFR50.62

Docket No. 50-461

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

Subject: Clinton Power Station
Implementation of Alternate Rod Injection
System Diversity Requirements

Dear Sir:

As required by 10CFR50.62, Illinois Power (IP) installed the Alternate Rod Injection (ARI) and Anticipated Transient Without Scram (ATWS) Reactor Pump Trip (RPT) systems at Clinton Power Station (CPS) to reduce the risk from an ATWS event. The rule required that the ARI system be designed to perform its function in a reliable manner and be independent (from the existing reactor trip system) from sensor output to the final actuation device. By submittal of this letter, IP affirms that the as-built ATWS ARI system employed at CPS is designed in accordance with the rule. In particular, the system is diverse from the reactor protection system from sensor output to the final actuation device as further explained below.

In a Safety Evaluation Report (SER) concerning the Brunswick Steam Electric Plant Unit 2 ATWS RPT instrumentation, the NRC concluded that the reactor trip system and the ARI and ATWS RPT designs at Brunswick did not meet the diversity requirements of the ATWS rule. This position was supported by the Statement of Considerations accompanying the ATWS rule which states that equipment diversity is required to the extent reasonable and practicable to minimize the potential for common cause failures from the sensors up to and including the components used to interrupt control rod power or vent the scram air header. The NRC staff indicated that diversity requires ARI trip units of different manufacture than those in the reactor trip system.

In response to the NRC staff interpretation of diversity, which was regarded as a generic issue, the BWR Owners Group (BWROG) filed several appeals. The primary arguments made in these appeals were that the ARI trip units should be considered part of the sensor and therefore be excluded from the diversity requirements; the trip units were already subject to other forms of diversity such as functional and application state diversity; and based on a cost-versus-safety benefit evaluation, replacing the trip units with a different manufacture should not be considered reasonable and practicable. The final BWROG appeal was denied as documented in the letter from J. M. Taylor to G. J. Beck dated September 20, 1990. It is now up to each utility to demonstrate that equipment diversity is provided in the ARI system as required by 10CFR50.62.

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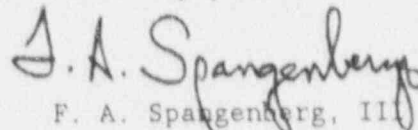
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IP asserts that the equipment used in the CPS ARI system is independent and diverse from the Reactor Protection System (RPS) in accordance with the ATWS rule. Diversity and independence is achieved at the sensor and end device to the extent possible. The ARI system functions independently of the RPS by providing an alternate means of venting the scram air headers by opening the redundant scram valves. The ARI function may be initiated manually or it may be initiated automatically in response to either reactor pressure vessel (RPV) high pressure or RPV low water level. Four locally mounted (outside primary containment), non-safety related, non-indicating pressure transmitters measure reactor pressure for the ARI functions at four physically separated locations, similar to those for RPS. These transmitters sense pressure from the same sensing lines used for the RPS; however, cables from these transmitters are routed to the trip modules in the ATWS panels. Similarly, four locally mounted, non-safety related, non-indicating level (differential pressure) transmitters measure reactor water level for the ARI functions at four physically separated locations. These transmitters sense pressure from the same sensing lines used for the RPS, and like the ATWS pressure transmitters, these level transmitters provide signals to the trip modules in the ATWS panels. Diversity in the CPS design extends to the final actuation device as the ARI system uses energize-to-function valves and DC power while the RPS uses deenergize-to-function valves and AC power.

In addition to diversity at the sensor and end-use level, diversity also exists at the trip unit and logic level. In particular, the RPS uses analog trip modules designed by General Electric (GE) while the ARI system is equipped with a Rosemount trip/calibration system. At Clinton, the RPS logic circuitry is part of the Nuclear Systems Protection System (NSPS) designed by General Electric. The NSPS logic is solid-state and includes the actuation logic for Containment and Reactor Vessel Isolation Control system, Emergency Core Cooling system, Reactor Core Isolation Cooling system and other safety-related systems associated with the nuclear steam supply system. The analog trip modules used in the RPS system were designed by General Electric for use and compatibility with the BWR-6 solid-state NSPS logic and are therefore diverse in design and manufacture relative to the Rosemount trip units (which have relay-type outputs) that are separately utilized in the ARI system.

Based on the above evaluation it is evident that, with particular regard to the NRC staff's expressed interpretation of diversity required by the ATWS rule, CPS is equipped with an ARI system which is in full compliance with the diversity requirements of 10CFR50.62, and no further action regarding diversity between the RPS and ATWS ARI as-built designs should be required.

Sincerely yours,



F. A. Spangenberg, III
Manager, Licensing and Safety

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cc: NRC Clinton Licensing Project Manager
NRC Resident Office
NRC Region III, Regional Administrator
Illinois Department of Nuclear Safety