Branch Technical Position HICB-9

Guidance on Requirements for Reactor Protection System Anticipatory Trips

A. Background

Several reactor designs have incorporated a number of anticipatory or "back-up" trips for which no credit was taken in the accident analyses. These trips, as a rule, were not designed to the requirements of ANSI/IEEE Std 279, "Criteria for Protection Systems for Nuclear Power Generating Stations," and therefore introduced non-safety-grade equipment into the reactor protection system. It was determined by the Staff that this was not an acceptable practice, because of possible degradation of the reactor protection system.

B. Branch Technical Position

All reactor trips incorporated in the reactor protection system should be designed to meet the requirements of ANSI/IEEE Std 279, or Reg. Guide 1.153, "Criteria for Power, Instrumentation, and Control Portions of Safety Systems." This position applies to the entire trip function, from the sensor to the final actuated device. For sensors located in non-seismic areas, the installation (including circuit routing) and design should be such that the effects of credible faults (i.e., grounding, shorting, application of high voltage, or electromagnetic interference) or failures in these areas could not be propagated back to the reactor protection system and degrade the reactor protection system performance or reliability. The sensors should be qualified to operate in a seismic event, i.e., not fail to initiate a trip for conditions which would cause a trip.

C. References

ANSI/IEEE Std 279-1971. "Criteria for Protection Systems for Nuclear Power Generating Stations."

Regulatory Guide 1.153. "Criteria for Power, Instrumentation, and Control Portions of Safety Systems." Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, 1996.