

LER 369/82-052

Event Description: Loss of Vital I and C Bus and Trip

Date of Event: June 13, 1982

Plant: McGuire 1

Summary

McGuire 1 was operating at about 75% power on June 13, 1982, when a loss of power occurred on vital instrumentation and control bus 1EKVA, causing failure of channel I of the reactor protection and instrument systems and the engineered safety feature (ESF) systems. Channel III of the reactor coolant system loop C flow instrumentation was already tripped and a 2 out of 3 coincidence low-flow reactor trip occurred. The ac vital bus power supply to bus 1EKVA was declared inoperable and the bus was repowered from its maintenance source. During the post-trip transient, the condensate-feedwater system was over-pressurized, several reheater relief valves lifted, and reheater D-1 relief line ruptured. Typical channel-A vital 120V ac loads expected on a 4-loop Westinghouse pressurized water reactor such as McGuire would include one train of nuclear instrumentation, various process indications, one isolation channel, inputs to both ESF trains and, possibly, one train of ESF slave relays.

This event was modeled as a loss of feedwater with unavailability of auto-initiation for one train of systems initiated by the ESF actuation system. Insufficient information was available to confirm the accuracy of the assumption that the ESF actuation system was affected, so this assumption may be conservative. Because of the assumed impacts of the loss of one channel of ESF output relays, one train of high-pressure injection was assumed to be unavailable when those systems would be auto-initiated [transient-induced loss-of-coolant accident]. Main feedwater was assumed to be unavailable, due to the effects of the system over-pressurization. The conditional core damage probability estimated for this event is 3.1×10^{-6} . The dominant core damage sequence includes the observed trip, failure of main and auxiliary feed water, and failure of feed-and-bleed cooling.