

LER 316/83-052

Event Description: Control Room Instrument Distribution Bus IV Fails, Trip

Date of Event: June 23, 1983

Plant: D.C. Cook2

Summary

During normal operation at 100% power, Cook Unit 2 suddenly tripped when a component failure resulted in the loss of the control room instrument distribution (CRID)-IV 120V ac vital bus. In addition to causing a reactor trip, the loss of the CRID-IV bus resulted in loss of power in the control room to several instrument and control circuits. Power was also lost to the solid-state protection system (SSPS) channel B slave relays.

The four CRID trains provide power to channels in the reactor protection system (RPS), the solid-state protection system, and various instrumentation panels. Licensee event report (LER) 316/82-072 does not specifically identify the affected system; however, such a listing may be found in LER 316/89-0014, which reports a similar failure of CRID-IV. These systems include the protection system status lights, 24 reactor coolant pump (RCP) operating parameter indication, steam generator wide-range level indication, loop 4 indication of auxiliary feedwater flow, two main steam pressure indicators, one channel of steam generator narrow-range level indication, and the steam dump control system.

The RPS is designed to fail safe on loss of CRID power, so loss of a CRID train will not prevent a trip. Redundant indications not dependent on CRID-IV exist to ensure that operators can monitor and control all necessary safety functions. The SSPS is designed so that two of four channels are generally sufficient to initiate a trip, so loss of certain CRID trains will not render either SSPS train inoperable. However, CRID-IV also provides power to the SSPS train B slave relays.

This event was modeled as a transient with (because of the unavailability of power to the SSPS train B slave relays) failure of auto-initiation of one train of HPI. The conditional core damage probability estimated for this event is 1.0×10^{-6} . The dominant core damage sequence involves the observed transient and failure of auxiliary feedwater (AFW), main feedwater (MFW), and feed and bleed.