



Facility: BSEP Unit No. 2

Event Date: February 2, 1982

While performing the functional test of the main steam line high radiation channel input to the Reactor Protection System (RPS) for a reactor scram and to the Primary Containment Isolation System (PCIS) for a Group I isolation, it was discovered that steam line high radiation channel D would not actuate when a test signal was applied to the channel's input instrument, D12-RM-K603D. At the time of this discovery, the remaining main steam line high radiation input channels A, B, and C had already been successfully tested according to the PT and were operable. These channels would have initiated a reactor scram and a Group I PCIS signal upon the receipt of an actual high radiation condition in A, B, or C main steam lines. The health and safety of the public was not affected by this event.

Following the discovery of the channel D inoperability, it was tripped in accordance with the action statement outlined in technical specifications and an investigation to determine the cause of the problem was begun.

An inspection of the normally energized D channel actuation relay, A71B-K44D, General Electric Model No. 12HFA51A49F, revealed the relay's movable contacts were held immovable against the stationary contacts due to the relay contact support armature physically adhering to the relay coil core assembly. This occurred when several of the relay coil turns electrically shorted causing a temperature increase in the coils that eventually broke down and melted the coil insulation. The melted insulation then dripped down on the relay contact support armature causing the physical adhering of the armature to the coil assembly.

The exact cause of the shorted relay coil turns is not known. Consultations with the relay supplier indicate that thermal aging of the enamel insulation on the relay coil turns is a definite factor in similar failures experienced by other utilities with this type relay. This problem has been previously documented in General Electric Service Information Letter No. 44 and IE Notice 81-01.

Present intended final corrective action concerning this event is to replace the existing Model No. HFA51A4 F relay coils utilized on continuously energized AC solenoids in the plant with a replacement coil, Kit No. 257A9680G18, during the upcoming Unit No. 2 refueling outage. However, this action is pending relay vendor testing to determine whether relay contactor arm bending observed in some of the failures experienced by other utilities is a factor in causing the excessive currents experienced in the relay coils which lead to breakdown of the coil insulation. If testing shows that relay contactor arm bending is not a factor in the relay coil failures, the replacement coil kit will be utilized. However, if testing shows relay contactor arm bending is a contributor to relay coil insulation breakdown, further study of the problem will be performed in order to determine what corrective actions are required.

Until final corrective actions concerning the use of this type relay coil have been made, the AC continuously energized HFA type relay coils utilized in the plant will be inspected on a monthly basis in order to detect and replace with duplicate coils any failing relay coils before complete coil failure is encountered.