

LER 395/83-019

Event Description: Both Residual Heat Removal Trains and One High-Pressure Injection Train Inoperable

Date of Event: March 17, 1983

Plant: Summer

Summary

On March 17, 1983, with the unit at full power, both trains of the residual heat removal (RHR) and one train of high-head safety injection (HHSI) were inoperable for approximately 45 minutes. RHR train B had been removed from service for preventive maintenance on March 16, 1983. The next day, train A of the chilled water system (CWS) failed to start after a surveillance test. The CWS provides cooling water to the component cooling water (CCW) pump motor bearings. The CCW system, in turn, supplies cooling water to the RHR pump seals and the RHR heat exchanger. As a result, RHR train A was inoperable. The CWS also provides cooling water to the HHSI pump oil coolers, so one train of this system also was considered inoperable per the criteria contained in the Summer individual plant examination (IPE). The CWS failure was traced to a problem in the starting circuitry of the chiller unit.

Since one train of HHSI was inoperable during this event, one train of high-pressure injection (HPI) and one train of feed and bleed were assumed unavailable. With both RHR trains inoperable, no RHR or high-pressure recirculation (HPR) was available. Since RHR train B was out of service when the failure of train A of the CWS occurred on March 17, it was assumed that both RHR trains and the HHSI train were unavailable for the 45-minute repair period. Transient, loss-of-offsite power (LOOP), loss-of-coolant accident (LOCA), and steam generator tube rupture (SGTR) were used as potential initiators in the unavailability analysis. The increase in core damage probability (CDP), or importance, over the duration of the event is 1.0×10^{-6} . The base-case CDP over the duration of the event is 8.1×10^{-9} , resulting in an estimated conditional core damage probability of 1.0×10^{-6} . The increase in CDP is due almost entirely to the postulated LOCA. The LOCA sequence consists of a postulated LOCA in the 45-minute period, successful reactor trip followed by successful operation of the auxiliary feedwater and remaining HPI trains. Subsequent reactor coolant system cooldown and depressurization to allow RHR initiation are successful, but the unavailable RHR and HPR systems then lead to core damage.