

## **LERs 302/82-041, 302/82-051, and 302/83-037**

Event Description: Transient with One RHR Pump Flow Control Valve Inoperable

Date of Event: June 8, 1982

Plant: Crystal River 3

### **Summary**

On June 8, 1982 while the operability of the boron injection system was being verified, discharge throttle valve DHV-111 of the decay heat removal (DHR) system failed to control flow automatically, as required in Technical Specification 3.5.2. DHR train B was declared inoperable. Maintenance was initiated, and DHR train B was restored later on June 8. A plant trip occurred nine days earlier, on May 30. The valve also malfunctioned on June 22, 1982. Maintenance was performed on the valve and the train was restored to service on June 23. A stuck high-flow switch was determined to be the cause for the malfunctioning valve. A plant trip also occurred six days prior to the valve failure (NUREG-0020). A similar event involving DHR train A occurred on July 28, 1982. While the borated water storage tank (BWST) was being recirculated with DHR pump 1A on July 28, the pump discharge throttle valve DHV-110 on DHR train A failed to operate correctly and was declared inoperable. Maintenance was initiated and the train was restored to operability later that day. The cause of the improper operation of DHV-110 was determined to be air in the flow indicating switch sensing lines that regulate the valve. A plant trip occurred on July 15, 13 days prior to the discovery of the valve malfunction (NUREG-0020). On September 7, 1983, another similar event occurred. While surveillance tests on the operability of the emergency core cooling system pumps were being performed, the breaker for valve DHV-110 tripped while cycling the valve from open to closed. The cause of the breaker trip was unknown. The breaker was reset and the valve cycled successfully. A plant trip occurred 11 days earlier on August 26 (NUREG-0020).

Although these events were separate, they were analyzed as one event since all involved a transient with one DHR pump flow control valve inoperable. It was assumed in this analysis that the throttle valve failed to control flow in such a way that there was insufficient flow from the DHR pump train. The first train of the residual heat removal (RHR) was set to failed to reflect the failure of the pump train due caused by failed flow control. Since high-pressure recirculation (HPR) uses the RHR pumps, the first train of HPR/RHR.AND.HPR were set to failed as well. The estimated conditional core damage probability for these events is  $4.8 \times 10^{-6}$ . The dominant sequence was a postulated anticipated transient without scram (ATWS) sequence involving the failure to trip and the failure of auxiliary feedwater and did not involve any modified branches.