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the southern electric system

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Docket No. 50-348

U. S. Nuclear Regulatory Commission
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Washington, D. C. 20555

Joseph M. Farley Nuclear Plant - Unit 1
Special Report No. 92-007, RHR Relief Valve Lift

Gentlemen:

In accordance with the requirements of Technical Specification 3.4.10.3,
the enclosed Special Report No. 92-007, Unit 1, is submitted.

Respectfully submitted,



J. D. Woodard

BHW:map 0101

enclosure

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Joseph M. Farley Nuclear Plant
Special Report No. 92-007
RHR Relief Valve Lift

This Special Report is being submitted in accordance with Technical Specification 3.4.10.3 due to the lifting of the A train Residual Heat Removal (RHR) pump suction relief valve to mitigate a Reactor Coolant System (RCS) pressure transient. At the time of this event the B train RHR pump suction relief valve was isolated for maintenance.

Circumstances Initiating the Transient

On 11-21-92 Unit 1 was operating in Mode 5 (Cold Shutdown), with RCS temperature at 184 degrees and RCS pressure at 400 psig (read from the A loop wide range pressure instrumentation) controlled by a pressurizer bubble. The B and C Reactor Coolant Pumps (RCPs) were running. Operations procedures provided an operating RCS pressure range under these conditions of 350-425 psig.

At 0616 on 11-21-92, the C RCP was secured for maintenance on the pump's resistance temperature detectors (RTDs). Due to normal thermal-hydraulic characteristics of the reactor coolant system, RCS pressure at the C loop hot leg increased when the C RCP was secured. The operators were monitoring and controlling RCS pressure using the C loop wide range pressure instrumentation. This pressure was near the high end of the allowable operating pressure band. The pressure increase which occurred due to securing the C RCP was sufficient to cause the A train RHR relief valve off the C loop to lift. The setpoint for the relief was verified to be 445 psig on October 15, 1992 during the Unit 1 eleventh refueling outage. The 445 psig setpoint is within the allowable tolerance for RHR suction relief valves of 450 psig plus 0 psig minus 10 psig. For the transient, pressure did not exceed 450 psig.

Effect of RHR Relief Valves on the Transient

The A train RHR relief valve off the C RCS loop lifted in response to the pressure increase. Approximately 1700 gallons of RCS inventory were relieved to the Pressurizer Relief Tank (PRT). The relief valve reseated approximately 4 minutes into the event limiting the RCS pressure drop to 376 psig. The subsequent addition of the colder makeup water caused RCS pressure to be further reduced, however, RCS pressure did not drop below 330 psig for the event. Pressurizer level dropped to approximately 0, however the core remained covered at all times. Pressurizer level was regained approximately 6 minutes into the event after the operators opened a flowpath from the Refueling Water Storage Tank (RWST) to the RCS. Normal system status was restored at 0630.

Corrective Action Necessary to Prevent Recurrence

An investigative team consisting of engineering personnel from the design organizations, the FNP staff and the corporate staff, was assembled and performed a detailed investigation of the event.

A test procedure was written and the sequence of events was simulated on Unit 1 at a lower system pressure. Following a review of the test results and evaluation of the conditions at the time of the event, the team concluded that the initial RCS pressure and resulting pressure increase from the C RCP trip caused the A train RHR relief valve to lift. The cause of the event was determined to be procedural deficiency in that the allowable operating RCS pressure range was too high for the prescribed plant conditions.

All snubbers and hangers supporting the RHR relief valve discharge piping were examined. No problems were found.

To provide additional operating margin, Westinghouse, based on documented engineering calculations, provided a lower RCS pressure operating band of 325-375 psig for RCP operation in the plant configuration where RHR is in service. Operations procedures have been revised accordingly.

Additional Information

Farley Nuclear Plant Unit 1 is a three loop Westinghouse pressurized water reactor. There are 2 RCS wide range pressure indicators, one on the A loop and one on the C loop. These pressure indicators are used when the RHR system is aligned to the RCS. The pressure seen by these two loops is dependent on whether or not the RCP on that loop is running. If the loop's RCP is running, the pressure seen in that loop can be approximately 20-25 psig lower than if the pump were not running.