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SOUTHERN COMPANY
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U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Joseph M. Farley Nuclear Plant
Response to Request for Additional Information Related to Generic Letter 96-06
"Assurance of Equipment Operability and Containment
Integrity during Design Basis Accident Conditions"

Ladies and Gentlemen:

By letters dated January 27, 1997, and May 23, 1997, Southern Nuclear Operating Company (SNC) provided the response to Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity during Design Basis Accident Conditions," for Joseph M. Farley Nuclear Plant (FNP) Unit 1 and Unit 2. NRC letter dated April 3, 1998, requested SNC to provide additional information, and SNC responded by letter dated June 29, 1998. During a telephone conference call on September 22, 1998, the NRC Staff requested additional information relative to the heat transfer scenario and single failures assumed/analyzed in the FNP containment cooler waterhammer analysis. The following provides the requested clarifications of the FNP analysis.

A. The following discussion provides clarification of the assumptions used in the heat transfer analysis.

As described in SNC's RAI response dated June 29, 1998, two calculations comprise the FNP containment cooler waterhammer analysis. The first calculation (SM-ES-89-1524-001, Rev. 3) utilized the computer code AWHAM that determined a peak pressure of 150 psig would result from the collapse of a vapor cavity if the service water temperature reached 164°F downstream of the containment coolers. The second calculation (SM-REA-94-0417, Rev. 0) is a heat transfer evaluation that determined the maximum service water temperature at the containment cooler discharge would be 119°F prior to the pump restart. This heat transfer calculation utilizes the following inputs and assumptions:

1) The service water flow rate through the containment coolers during the transient was determined from the AWHAM model of the service water system. This model determined service water flow through the coolers would continue due to the pump coastdown, the inertia of the water in the service water headers, and gravity. The service water pond is higher than the service water discharge.

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2) The containment cooler tube wall temperature is conservatively assumed to be the same as the containment temperature profile as determined by the LOCA/LOSP containment pressure/temperature analysis.

3) The containment cooler fans were assumed to be running at the design flow rate of 60,000 cfm.

4) The initial service water temperature in the containment coolers was assumed to be 97°F, which is the expected containment cooler service water outlet temperature during normal operation.

B. A discussion of the failures assumed to maximize waterhammer event follows.

The following failures were assumed in the AWHAM waterhammer analysis model to maximize the resulting pressure spike (e.g., minimize back pressure).

1) The service water discharge standpipe in the yard (outside containment) was assumed to fail at the ground elevation (~155'), which minimizes the back pressure on the service water system inside containment.

2) Following a LOCA/LOSP, two service water pumps will start between 12 and 23 seconds. The service water pumps were conservatively assumed to start 23 seconds after the LOCA/LOSP to maximize the time for draindown and void formation.

3) The acceleration times for the service water pumps range from ~1 to 4.0 seconds. The service water pumps were conservatively assumed to accelerate to full speed in 1 second following restart to maximize the pressure spike and water column velocities upon vapor cavity collapse.

4) The AWHAM model was conservatively based on the shortest service water piping run from a containment cooler discharge to the highest elevation in containment to simulate the most likely location for vapor formation.

5) No vacuum breakers within the service water system were assumed to be operational during the transient to maximize void formation at the high points.

6) All associated air operated valves were assumed to move to their loss-of-air positions, most moving to the wide open position, resulting in minimum back pressure on the service water system inside containment.

If you have any questions, please advise.

Respectfully submitted,

SOUTHERN NUCLEAR OPERATING COMPANY

Dave Morey

Sworn to and subscribed before me this 1st day of Oct. 1998

Martha Dayle Dow
Notary Public

My Commission Expires: November 1, 2001.

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Attachment

cc: Mr. L. A. Reyes, Region II Administrator
Mr. J. I. Zimmerman, NRR Project Manager
Mr. T. P. Johnson, Plant Sr. Resident Inspector