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the southern electric system

HVS-44
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X7GJ17-H110

September 8, 1988

U.S. Nuclear Regulatory Commission
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PLANT HATCH - UNITS 1, 2
NRC DOCKETS 50-321, 50-366
OPERATING LICENSES DPR-57, NPF-5
RESPONSE TO BULLETIN 88-08
THERMAL STRESS IN PIPING

Gentlemen:

The subject NRC Bulletin (NRCB) 88-08, "Thermal Stresses in Piping Connected to Reactor Coolant Systems," dated June 22, 1988, requested licensees to:

1. Review the Reactor Coolant System (RCS) to identify any connected, unisolable piping that could be subjected to temperature distributions which would result in unacceptable thermal stresses.

2. Take action, where such piping is identified, to ensure the piping will not be subjected to unacceptable thermal stresses. NRCB 88-08 was issued as the result of a leak detected in an unisolable section of the Emergency Core Cooling System (ECCS) piping at a pressurized water reactor (PWR). The Bulletin also specifies the following actions be taken by licensees:

   - Review systems connected to the RCS for unisolable piping that could be subjected to the thermal cycling phenomenon. If none are identified, no action is required.

   - For identified piping, perform nondestructive examination of the welds, heat-affected zones, and high-stress locations.

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- Develop and implement a program to provide continuing assurance that the identified piping will not be subject to conditions that could cause fatigue failure during the remaining life of the plant.

The first action is to be completed within 60 days of receipt of the Bulletin. The remaining actions are to be completed by the end of the next refueling outage that ends 90 days after the Bulletin is received.

NRCB 88-08 states: "thermal fatigue of unisolable piping connected to the RCS can occur when the connected piping is isolated by a leaking block valve, the pressure upstream from the block valve is higher than RCS pressure, and the temperature upstream is significantly cooler than RCS temperature." Piping must fall within these parameters if the Bulletin is to be considered applicable. The systems operating at a higher pressure and/or contain cooler water than the RCS are as follows:

1. High Pressure Coolant Injection (HPCI).
2. Reactor Core Isolation Cooling (RCIC).
3. Standby Liquid Control (SLC).
4. Reactor Water Cleanup (RWC).
5. ECCS Stayfill Systems.
6. Control Rod Drive (CRD).

If the injection valves in these systems leak during normal plant operation (including hot standby and cold shutdown), it is possible for thermal stratification to develop in the injection line. The following is an assessment of these systems where they could be operated in a manner that could create conditions similar to those discussed in NRCB 88-08.

High Pressure Coolant Injection

Normally, the HPCI system is at a pressure lower than the RCS so leakage past the injection valves will not occur. During testing of the HPCI system, its pressure could exceed that of the RCS; however, testing is only for periods of short duration (typically less than 1 hour) and is only performed on a monthly basis for Unit 1 and a quarterly basis for Unit 2. The HPCI system injects into the feedwater line. The feedwater line contains check valves in series. The HPCI injection line ties into the feedwater line, outside of primary containment, such that there is at least one check valve down stream of the injection point. Leakage could possibly occur during the tests; however, as previously stated, the tests are infrequently performed and for short periods of time. Additionally, since the injection point is upstream of one of the check valves, any break would be isolable.

Reactor Core Isolation Cooling

Like the HPCI system, the RCIC system is normally at a pressure lower than the RCS (except during testing) and injects via the feedwater system.

Standby Liquid Control System

The SLCS has the capability to inject cold water into the RCS during testing but is isolated from the RCS by squib valves which historically do not exhibit leakage. Additionally, since the SLCS is such a low-flow system, it should not be a source of concern.

Reactor Water Cleanup

The RWC system is normally at a pressure equal to or less than the RCS and injects into the RCS via the feedwater system. The injection point is outside of primary containment, such that there is at least one check valve down stream of the injection point. If a break should occur, it would be isolable.

ECCS Stayfill Systems

The shutoff head of the pumps used to keep the ECCS filled with water is insufficient to overcome RCS pressure and inject water into the RCS.

Control Rod Drive

Although not directly related to the NRCB, the standby mode of the Control Rod Drive (CRD) hydraulic control system creates potential thermal stresses in the Reactor Water Cleanup (RWCU) system piping downstream of the CRD system connection. The CRD pumps are a potential source of high pressure makeup to the reactor in this mode. The RWCU piping downstream of the CRD thermal mixing tee can be isolated and therefore the reactor coolant pressure boundary is maintained. Plant Hatch has experienced thermal fatigue cracks on Unit 1 RWCU piping downstream of the CRD thermal mixing tee. A Design Change Request (87-19) has been implemented to replace the stainless steel piping of the RWCU with carbon steel pipe. Carbon steel, because of its higher thermal conductivity and lower coefficient of thermal expansion, incurs lower stress due to temperature fluctuations. Unit 2 was initially constructed with carbon steel RWCU piping.

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If you have further questions in this regard, please contact this office at any time.

Mr. W. G. Hairston, III states he is a Senior Vice President of Georgia Power Company and is authorized to execute this oath on behalf of Georgia Power Company, and to the best of his knowledge and belief, the facts set forth in this letter are true.

GEORGIA POWER COMPANY

By: W. G. Hairston, III

W. G. Hairston, III

Sworn to and subscribed before me this 8th day of September 1988.

Notary Public

Notary Public, Fulton County, Ga.
My Commission Expires Nov. 2, 1991

JDH/ac

c: Georgia Power Company
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