

February 7, 2005

Mr. Karl W. Singer
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: BROWNS FERRY NUCLEAR PLANT, UNIT 1 — CLOSEOUT OF GENERIC LETTER 96-06, "ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT INTEGRITY DURING DESIGN-BASIS ACCIDENT CONDITIONS" (TAC NO. MC3186)

Dear Mr. Singer:

On September 30, 1996, the U.S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident Conditions," to holders of operating licenses for nuclear power reactors, except those that have been amended for a possession-only status. The GL requested information from licensees related to two concerns: (1) water hammer and two-phase flow in the cooling water systems that serve the containment air coolers during postulated accident conditions, and (2) thermally induced overpressurization of isolated water-filled piping systems that penetrate the containment.

By letter dated May 12, 2004, the Tennessee Valley Authority (TVA) provided its response to the GL for the Browns Ferry Nuclear Plant, Unit 1. The NRC staff has completed its review of the response, and concluded that, based on the evaluation contained in the enclosure, TVA has provided an acceptable resolution to the GL 96-06 concerns. If you have any questions regarding this matter, please contact me at (301) 415-4041.

Sincerely,

/RA/

Margaret H. Chernoff, Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No.: 50-259

Enclosure: Safety Evaluation

cc w/encl: See next page

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cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

GENERIC LETTER 96-06, ASSURANCE OF EQUIPMENT OPERABILITY AND

CONTAINMENT INTEGRITY DURING DESIGN-BASIS ACCIDENT CONDITIONS

BROWNS FERRY NUCLEAR PLANT, UNIT 1

DOCKET NUMBER 50-259

INTRODUCTION

On September 30, 1996, the U. S. Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions." The GL included a request for licensees to evaluate cooling water systems that serve containment air coolers during postulated accident conditions to assure that they are not vulnerable to water hammer and two-phase flow conditions. Additionally, licensees were requested to evaluate piping systems that penetrate containment to determine if they are susceptible to thermal expansion of fluid which could lead to overpressurization of piping. By letter dated May 12, 2004, the Tennessee Valley Authority (TVA or the licensee) provided its response to the GL for the Browns Ferry Nuclear Plant (BFN), Unit 1.

WATER HAMMER AND TWO-PHASE FLOW ISSUES

By letter dated February 15, 2000, the NRC staff accepted TVA's resolution of the water hammer and two-phase flow issues for BFN Units 2 and 3. At that time, resolution of the GL issues for Browns Ferry Unit 1 was not addressed because the plant was being maintained in a shutdown and defueled condition. The staff indicated in its February 15, 2000, letter to TVA that resolution of GL 96-06 for BFN Unit 1 would be revisited in the event of plant restart.

Based on the analysis performed using the Generation of Thermal-Hydraulic Information for Containments (GOTHIC) 5.0c computer program, TVA has determined that the liquid in the containment cooler coils will not boil during a design-basis steam line break or loss-of-coolant accident. Therefore, water hammer and two-phase flow conditions will not occur. The licensee's analysis and conclusions for BFN Unit 1 are similar to and consistent with those that were reached for BFN Units 2 and 3. Boiling in the Reactor Building Closed Cooling Water (RBCCW) System is precluded by the static pressure that is provided by the respective unit's RBCCW System head tank. Therefore, the NRC staff finds that the licensee's resolution of the GL 96-06 waterhammer and two-phase flow issues for BFN Unit 1 is acceptable.

Enclosure

Although the staff considers the licensee's response and resolution of the GL 96-06 water hammer and two-phase flow issues to be acceptable for BFN Unit 1, a detailed quantitative assessment of the licensee's waterhammer and two-phase flow analyses, and a review of the licensee's use and application of computer codes for performing these analyses have not been performed by the staff.

THERMALLY INDUCED PRESSURIZATION OF PIPING RUNS

TVA submittal indicated that the conclusions from the BFN Unit 1 evaluation are consistent with the previous evaluations for Units 2 and 3. As a result of these evaluations, TVA committed to the following actions prior to the restart of BFN Unit 1:

- Modify the Unit 1 drywell floor and equipment drain sump discharge lines to provide a designed method of overpressure protection.
- Revise plant procedures to ensure water is partially drained from portions of the demineralized water system inside the drywell and the system left open to the drywell during power operation.

The NRC staff review of TVA's actions in response to GL 96-06 for BFN Units 2 and 3 is documented in a letter from NRC to TVA dated February 15, 2000. The staff noted in the letter that procedural modifications would be made at BFN to ensure that the demineralized water system cannot be overpressurized, and that the drywell floor and equipment drain sump discharge lines would be modified at BFN Units 2 and 3 to provide overpressure protection. TVA's previous actions were reviewed and found acceptable by the staff.

The staff finds that TVA's evaluation and commitments for BFN Unit 1 are consistent with its previous actions regarding BFN Units 2 and 3. Therefore, the staff concludes that TVA's commitments provide an acceptable resolution for the issue of thermally-induced pressurization of piping runs penetrating containment for BFN Unit 1.

CONCLUSION

Based upon the discussions above, the NRC staff concludes that the licensee's response and resolution of the water hammer and two-phase flow issues, and its commitments to provide a satisfactory resolution for the thermally-induced pressurization of piping runs penetrating containment are acceptable for BFN Unit 1. This evaluation concludes the NRC staff's review on this subject and closes-out TAC No. MC3186.

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Date: February 7, 2005

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BROWNS FERRY NUCLEAR PLANT

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