September 25, 2008

Mr. William R. Campbell, Jr. 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, UNITS 1, 2, AND 3 – GENERIC LETTER 2008-01, "MANAGING GAS ACCUMULATION IN EMERGENCY CORE COOLING, DECAY HEAT REMOVAL, AND CONTAINMENT SPRAY SYSTEMS," PROPOSED ALTERNATIVE COURSE OF ACTION (TAC NOS. MD7799, MD7800, AND MD7801)

Dear Mr. Campbell:

On January 11, 2008, the Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" (Agencywide Documents Access and Management System Accession No. ML072910759). The GL requested licensees to submit information to demonstrate that the emergency core cooling, decay heat removal, and containment spray systems (hereinafter referred to as the "subject systems") are in compliance with the current licensing and design basis and applicable regulatory requirements, and that suitable design, operational, and testing control measures are in place for maintaining this compliance.

In accordance with Section 50.54(f) of Title 10 of the *Code of Federal Regulations*, GL 2008-01 required that each licensee submit the requested information within 9 months (hereinafter referred to as the "9-month submittal") of the date of the GL. The GL also stated that if a licensee cannot meet the requested 9-month response date, the licensee is required to provide a response within 3 months (hereinafter referred to as the "3-month submittal") of the date of the GL, describing the alternative course of action it proposes to take, including the basis for the acceptability of the proposed alternative course of action.

In a letter dated June 6, 2008, the Tennessee Valley Authority, the licensee, submitted a 3-month response to GL 2008-01 for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. This letter indicated that the licensee was unable to provide all the information requested within 9 months and proposed an alternative course of action.

The NRC staff reviewed the licensee's proposed alternative course of action and the associated basis for acceptance. The responses provided commitments to complete and provide to the NRC the results of the walkdowns of the accessible portions of emergency core cooling systems in the 9-month submittal. The NRC staff finds that the 9-month submittal should complete the information necessary for the NRC staff to make a determination regarding compliance with the BFN licensing and design basis.

It should be noted that the scope of the additional information requested is described in the enclosure. If you have any questions regarding this letter, please feel free to contact David Beaulieu at (301) 415-3243.

Sincerely,

/RA/

Thomas H. Boyce, Chief Plant Licensing Branch II-2 Division of Operating Reactor Licensing Office of Nuclear Reactor Regulation

Docket Nos.: 50-259, 50-260 and 50-296

Enclosure: As stated

cc w/encl: See next page

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BROWNS FERRY NUCLEAR PLANT

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U.S. NUCLEAR REGULATORY COMMISSION

ASSESSMENT OF 3-MONTH RESPONSE

TO GENERIC LETTER 2008-01

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNITS 1, 2, AND 3

DOCKET NOS. 50-259, 50-260, 50-296

1.0 <u>Background</u>

On January 11, 2008, the Nuclear Regulatory Commission (NRC) issued Generic Letter (GL) 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems" (Agencywide Documents Access and Management System Accession No. ML072910759). The GL requested licensees to submit information to demonstrate that the emergency core cooling, decay heat removal, and containment spray systems (hereinafter referred to as the "subject systems") are in compliance with the current licensing and design bases and applicable regulatory requirements, and that suitable design, operational, and testing control measures are in place for maintaining this compliance. Specifically, the GL requested licensees to the GL, (2) a description of all corrective actions that the licensee determined were necessary, and (3) a statement regarding which corrective actions were completed, the schedule for completing the remaining corrective actions, and the basis for that schedule.

In accordance with Section 50.54(f) of Title 10 of the *Code of Federal Regulations,* GL 2008-01 required that each licensee submit the requested information within 9 months (hereinafter referred to as the "9-month submittal") of the date of the GL. The GL also stated that if a licensee cannot meet the requested 9-month response date, the licensee is required to provide a response within 3 months (hereinafter referred to as the "3-month submittal") of the date of the GL, describing the alternative course of action it proposes to take, including the basis for the acceptability of the proposed alternative course of action.

2.0 Licensee's Proposed Alternative Course of Action

By letter dated June 6, 2008, Tennessee Valley Authority (TVA), the licensee, submitted a revised 3-month response to GL 2008-01 for Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3. TVA indicated that BFN would complete within the requested 9 months a significant amount of the requested actions including reviews of plant design, licensing basis documentation, system operating and testing procedures and submit this information to the NRC by October 11, 2008. However, it indicated that one of the GL 2008-01 reporting requests would not be completed by the requested response time. This action was the walkdowns of some segments of piping of the subject systems, including the High Pressure Coolant Injection (HPCI), Core Spray (CS), and the Residual Heat Removal (RHR). The licensee indicated that

they could not complete the walkdowns because portions of the subject systems are inaccessible during power operation due to the need to remove insulation or shielding, erect scaffolding, enter the inert containment atmosphere, or enter a high radiation area to obtain adequate access for the requested detailed inspections.

For pipe located outside containment, most field walkdowns needed to determine pipe configuration details would be performed before October 11, 2008. The licensee identified that the following piping sections inside containment and the steam tunnel that will not be accessed until the next available refueling outage after December 2008 because of the potential of high radiation and the inert containment atmosphere:

- CS discharge piping Containment penetration to reactor vessel.
- HPCI discharge piping Steam tunnel penetration to its connection to the Main Feedwater piping.
- RHR System suction and discharge piping Containment penetration to the connection to the Reactor Recirculation System Piping.

As an alternative course of action, the licensee's 3-month submittal dated June 6, 2008, listed the following commitments:

- 1. Complete by October 11, 2008 GL 2008-01 actions for affected BFN systems, with the exception of the investigative or confirmatory walkdowns postponed until the next refueling outage for each unit.
- 2. Complete the detailed walkdowns of Units 1, 2, and 3 inaccessible piping sections of GL 2008-01 subject systems prior to startup for the refueling outage listed below for respective units (Unit 1 Cycle 8, Unit 2 Cycle 15, and Unit 3 Cycle 14).
- 3. Complete the evaluations of GL 2008-01 subject systems using results of the detailed walkdowns of inaccessible piping sections, and submit supplemental responses to the NRC documenting completion of the walkdowns and any impact upon the GL 2008-01 response as a result of completed evaluation within 90 days following startup from the refueling outages listed below (Unit1 Cycle 8, Unit 2 Cycle 15, and Unit 3 Cycle 14).
- 4. Evaluate the applicability for Units 1 and 3 of the corrective action program (CAP) that incorporated actions for the GL 2008-01 adverse conditions discovered during the Unit 2 refueling outage.

The licensee indicated that the next available refueling outages after December 2008 are currently scheduled as follows:

Unit 1 - fall 2010 Unit 2 - spring 2009 Unit 3 - spring 2010

For Unit 1, the next refueling outage (Cycle 7) is currently scheduled to start on October 27, 2008. The licensee stated that there is insufficient time to plan adequate walkdowns during this outage. Therefore, TVA proposed to complete the detailed walkdowns of

the Unit 1 inaccessible piping sections in the next refueling outage (Cycle 8) that is planned for the fall of 2010.

The licensee indicated that GL 2008-01 adverse conditions discovered during the Unit 2 refueling outage would be entered into the CAP and evaluated for applicability for Units 1 and 3. The licensee's CAP ensures that deficiencies identified at one unit will be considered for applicability to the other units.

In a July 11, 2008, letter, the licensee proposed to move forward its schedule for completing walkdowns on Unit 1 from the Cycle 8 refueling outage to the Cycle 7 refueling outage. It revised the above-described Commitments 2 and 3 as follows:

- 1. Complete the detailed walkdowns of Units 1, 2, and 3 inaccessible piping sections of GL 2008-01 subject systems prior to startup for the listed refueling outage for respective units (Unit 1 Cycle 7, Unit 2 Cycle 15, and Unit 3 Cycle 14).
- 2. Complete evaluations of GL 2008-01 subject systems, using results of the detailed walkdowns of inaccessible piping sections and submit supplemental responses to NRC documenting completion of the walkdowns and any impact upon the GL 2008-01 response as a result of completed evaluation within 90 days following startup from the listed refueling outages (Unit 1 Cycle 7, Unit 2 Cycle 15, and Unit 3 Cycle 14).

In addition, the licensee revised Commitment 4 to be in agreement with Commitments 2 and 3 as follows:

4. Evaluate the applicability for Units 2 and 3 of the CAP that incorporated actions for the GL 2008-01 adverse conditions discovered during the Unit 1 refueling outage.

The licensee stated that it has confidence the GL subject systems can fulfill their required design functions, based on its operating experience, which includes system walkdowns, detailed evaluations, and testing performed since plant licensing. In addition, the licensee stated that by October 11, 2008, it would complete GL 2008-01 requested actions, with the exception of the confirmatory walkdowns that will not be completed until the fall 2009 refueling outage. The outage walkdowns are expected to be validation activities of the design reviews for the subject systems.

3.0 NRC Staff Assessment

The NRC staff reviewed the licensee's proposed alternative course of action and the associated basis for acceptance. The responses provided commitments to complete and provide to the NRC the results of the walkdowns of the accessible portions of emergency core cooling systems (ECCs) by October 11, 2008. The response also indicated that some accessible areas would not be walked down due to the need to remove shielding or insulation and/or erect scaffolding. The licensee intends to perform evaluations of these runs of piping.

As you are aware, back in the mid-80's it was identified (NUREG-1232, Volume 3, *Safety Evaluation Report on Tennessee Valley Authority: Browns Ferry Nuclear Performance Plant*) that TVA had failed to consistently maintain a documented design bases and to consistently control the plant's configuration with that basis. The establishment of a program, which if

implemented correctly, should maintain consistency between the as-designed and as-built configuration, resolved this concern. Should these evaluations primarily rely on piping and instrumentation drawings and/or isometric drawings, a confirmation that those drawings have been field verified (since the voluntary shutdown and restart of each BFN unit), and that they accurately reflect the as-built configuration, should be included. In addition, the percentage of evaluations versus actual plant walkdowns should be provided.

The NRC staff found the proposed actions lacked sufficient detail to demonstrate compliance, so the licensee supplemented the response on July 11, 2008. The NRC staff reviewed the basis provided for the alternative approach. The licensee cited existing operating experience and testing associated with managing gas accumulation. Given that Unit 1 was shut down for 20 years due, in part, to concerns with the as-built configuration and has just recently restarted, the NRC staff questions the applicability of operating experience since initial construction. However, as Unit 1 will complete walkdowns of the ECCS before restarting in November 2008, the NRC staff finds reliance on existing surveillance testing until the walkdowns are complete acceptable. Additionally, the renewed focus on potential issues as well as the absence of significant gas accumulation issues recently for Units 2 and 3 provides confidence that adequate information will be provided in the 9-month submittal to allow the NRC staff to make a determination regarding compliance with the BFN licensing and design bases.

However, it was noted that the licensee's submittals did not mention other potential long-term actions that were requested in the GL. The NRC staff recognizes, that the industry is assessing whether it is necessary to perform pump testing to determine the allowable limits on ingested gas volume in pump suction piping, as well as, whether analysis development is needed to assess gas transport in the subject system piping as a function of system flow. As it is unlikely this industry effort will be complete for the 9-month initial or supplemental submittals, TVA should address in the 9-month submittal what actions will be taken to ensure completion of BFN's response regarding long-term actions and any necessary licensing activities.

Further, Technical Specification (TS) changes may be necessary to reflect the improved understanding achieved during response to the GL. As the time available may not support submittal during the 9-month initial or supplemental submittals, a TS Task Force traveler may be available by that time to provide a generic example that can be adopted by licensees. The NRC staff requests that the licensee address in its 9-month submittal how it plans to track such long-term actions (e.g., CAP and/or commitment tracking). The NRC plans to perform follow-up inspections of licensee responses to GL 2008-01 at all plants using a Temporary Instruction inspection procedure.

To summarize, the NRC staff finds the actions proposed for BFN regarding GL 2008-01 acceptable until field verifications can be completed and analyzed. Additional information is expected to be submitted by October 11, 2008 (9-month submittal), to address all accessible areas of concern. The field verification for each BFN unit is expected to be completed at the next scheduled refueling outage. A response describing the results of these confirmatory walkdowns is expected 90-days after restart. Each letter should include the following information:

- 1. A description of the results of evaluations that were performed in response to the GL;
- 2. A description of all corrective actions that the licensee determined were necessary; and

3.