UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 11, 2010

Mr. Ashok Bhatnagar
Senior Vice President
Nuclear Generation Development
and Construction
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – SAFETY EVALUATION REGARDING GENERIC LETTER 1998-02, "LOSS OF REACTOR COOLANT INVENTORY AND ASSOCIATED POTENTIAL FOR LOSS OF EMERGENCY MITIGATION FUNCTIONS WHILE IN A SHUTDOWN CONDITION" (TAC NO. MD6722)

Dear Mr. Bhatnager:

In a letter dated September 7, 2007 (Agencywide Document Access and Management System (ADAMS) Accession No. ML072570676), which references letter dated November 24, 1998 (ADAMS Accession No. ML082460081), as supplemented by letter dated April 1, 2010 (ADAMS Accession No. ML100950044) the Tennessee Valley Authority (TVA) submitted a response to U.S. Nuclear Regulatory Commission (NRC) Generic Letter 1998-02, "Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency Mitigation Functions while in a Shutdown Condition," for Watts Bar Nuclear Plant, Unit 2 (WBN Unit 2).

The NRC staff has reviewed TVA's response. Enclosed is the NRC staff's safety evaluation. Please note that the safety evaluation enclosed with this letter supersedes the safety evaluation issued by the NRC staff by letter dated March 3, 2010 (ADAMS Accession No. ML100260108). This completes the NRC staff's efforts regarding WBN Unit 2 for TAC No. MD6722.

Sincerely,

Patrick D. Milano Acting Chief
Watts Bar Special Projects Branch
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-391

Enclosure: Safety Evaluation

cc w/encl: Distribution via Listserv

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SAFETY EVALUATION BY THE

OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO

GENERIC LETTER 1998-02, "LOSS OF REACTOR COOLANT INVENTORY AND

ASSOCIATED POTENTIAL FOR LOSS OF EMERGENCY MITIGATION FUNCTIONS

WHILE IN A SHUTDOWN CONDITION"

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-391

1.0 INTRODUCTION

In a letter dated September 7, 2007 (Agencywide Document Access and Management System (ADAMS) Accession No. ML072570676), which references letter dated November 24, 1998 (ADAMS Accession No. ML082460081), the Tennessee Valley Authority (TVA) submitted a response to U.S. Nuclear Regulatory Commission (NRC) Generic Letter (GL) 1998-02, "Loss of Reactor Coolant Inventory and Associated Potential for Loss of Emergency Mitigation Functions while in a Shutdown Condition," for Watts Bar Nuclear Plant (WBN), Unit 2. By letter dated March 3, 2010 (ADAMS Accession No. ML100260108), the NRC staff issued safety evaluation concluding that TVA's responses for WBN Unit 2 regarding GL 1998-02 are acceptable.

By letter dated April 1, 2010 (ADAMS Accession No. ML100950044), TVA provided the NRC staff with supplemental information. The NRC staff reviewed the supplemental information and concluded that the safety evaluation issued by letter dated March 3, 2010, needed to be revised to address the impact of the additional information.

2.0 REGULATORY EVALUATION

The general design criteria (GDC) establish the necessary design, fabrication, construction, testing, and performance requirements for structures, systems and components important to safety. The applicable GDC for GL 1998-02 are GDC 1, "Quality standards and records"; GDC 14, "Reactor coolant pressure boundary"; GDC 15, "Reactor coolant system design"; and GDC 35, "Emergency core cooling."

Enclosure

The appropriate GDC state the following:

> *Criterion 1--Quality standards and records.* Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, they shall be identified and evaluated to determine their applicability, adequacy, and sufficiency and shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function. A quality assurance program shall be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety functions. Appropriate records of the design, fabrication, erection, and testing of structures, systems, and components important to safety shall be maintained by or under the control of the nuclear power unit licensee throughout the life of the unit.
>
> *Criterion 14--Reactor coolant pressure boundary.* The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.
>
> *Criterion 15--Reactor coolant system design.* The reactor coolant system and associated auxiliary, control, and protection systems shall be designed with sufficient margin to assure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences.
>
> *Criterion 35--Emergency core cooling.* A system to provide abundant emergency core cooling shall be provided. The system safety function shall be to transfer heat from the reactor core following any loss of reactor coolant at a rate such that (1) fuel and clad damage that could interfere with continued effective core cooling is prevented and (2) clad metal-water reaction is limited to negligible amounts.
>
> Suitable redundancy in components and features, and suitable interconnections, leak detection, isolation, and containment capabilities shall be provided to assure that for onsite electric power system operation (assuming offsite power is not available) and for offsite electric power system operation (assuming onsite power is not available) the system safety function can be accomplished, assuming a single failure.

3.0 TECHNICAL EVALUATION

GL 1998-02 was issued on May 28, 1998, to request licensees of operating pressurized-water reactors to perform an assessment of the susceptibility of their residual heat removal (RHR) and emergency core cooling (ECC) systems for a common-cause failure as a result of reactor coolant system draindown in a shutdown condition. The licensees were required to: (1) assess whether their ECC systems were susceptible to this common-cause failure, and (2) if their plant

was susceptible, submit a description of their Part 50, Appendix B, quality assurance program that provides assurance that the safety-related functions of the RHR and ECC systems will not be adversely affected by activities conducted in a plant shutdown condition.

TVA provided its response to GL 1998-02 for WBN Unit 1 in a letter dated November 24, 1998 (ADAMS Accession No. ML082460081). By letter dated February 14, 2000 (ADAMS Accession No. ML003683323), the Region II NRC staff issued NRC Inspection Report No. 50-390/99-11 and 50-391/99-11. The subject inspection report contained details of the NRC staff's on-site verification of activities that TVA undertook in response to GL 1998-02 for WBN Unit 1. Specifically, the inspector verified that TVA had effectively implemented administrative controls, configuration management, and operating procedures to preclude an inadvertent draindown event as described in GL 1998-02.

The NRC staff concluded that TVA performed a thorough assessment of plant vulnerabilities similar to those described in GL 1998-02. The Region II inspector verified operational controls utilized and found that TVA had adequately implemented elements of the Quality Assurance Program described in the GL response.

The NRC staff has reviewed TVA's responses, dated September 7, 2007 and April 1, 2010, and confirmed that TVA will perform a similar review and document the results for WBN Unit 2. Since the WBN Unit 1 response was previously concluded to be a thorough assessment of plant vulnerabilities by the NRC staff in an inspection report dated February 14, 2000, the staff finds the response for WBN Unit 2 acceptable. In a letter dated September 7, 2007, TVA committed to perform a similar review on WBN Unit 2 that was performed on WBN Unit 1 and will document the WBN Unit 2 results. In letter dated April 1, 2010, TVA also committed to ensure that the guidance added to the WBN Unit 1 procedure as a result of the review of GL 1998-02 is incorporated into the WBN Unit 2 procedures. Specifically, when decreasing power, normally locked closed refueling water return valve (HCV-74-34) has a hold order placed with specific release criteria before entry into Mode 4 and to remove the hold order before entry into Mode 3, when returning to power. TVA activities are subject to NRC audit/inspection, if any.

4.0 CONCLUSION

Staff Requirements Memorandum (SRM), dated July 25, 2007 (ADAMS Accession No.ML072060688), for SECY-07-0096 – "Possible Reactivation of Construction and Licensing Activities for the Watts Bar Nuclear Plant Unit 2," stated:

> The Commission supports a licensing review approach that employs the current licensing basis for Unit 1 as the reference basis for the review and licensing of Unit 2.

In accordance with the SRM for SECY-07-0096, the NRC staff finds that TVA's responses for WBN Unit 2 regarding GL 1998-02 are acceptable since TVA will perform a similar review as WBN Unit 1 and document the results. Also, TVA will incorporate the guidance added to WBN Unit 1 procedure as a result of the review of GL 1998-02. TVA activities are subject to NRC audit/inspection, if any.

Principle Contributor: John G. Lamb and Balwant K. Singal
Date: May 11, 2010

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Sincerely,
/JWiebe RA for/
Patrick D. Milano Acting Chief
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cc w/encl: Distribution via Listserv

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