



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

February 1, 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 1998-04, “POTENTIAL FOR DEGRADATION OF THE
EMERGENCY CORE COOLING SYSTEM AND THE CONTAINMENT SPRAY
SYSTEM AFTER A LOSS-OF-COOLANT ACCIDENT BECAUSE OF
CONSTRUCTION AND PROTECTIVE COATING DEFICIENCIES AND FOREIGN
MATERIAL IN CONTAINMENT” (TAC NO. MD6723)**

Dear Mr. Bhatnager:

In a letter dated September 7, 2007 (see Agencywide Document Access and Management System Accession No. ML072570676), which references letters dated November 10, 1998, the Tennessee Valley Authority (TVA) submitted a response to U.S. Nuclear Regulatory Commission (NRC) Generic Letter 1998-04, “Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment,” for Watts Bar Nuclear Plant, Unit 2.

The NRC staff has reviewed TVA’s response. Enclosed is the NRC staff’s safety evaluation. This completes the NRC staff’s efforts regarding WBN Unit 2 for TAC No. MD6723.

Sincerely,

A handwritten signature in black ink, appearing to read "P. Milano", is positioned above the typed name.

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

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SAFETY EVALUATION BY THE
OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO
GENERIC LETTER 1998-04, "POTENTIAL FOR DEGRADATION OF THE
EMERGENCY CORE COOLING SYSTEM AND THE CONTAINMENT SPRAY SYSTEM
AFTER A LOSS-OF-COOLANT ACCIDENT BECAUSE OF CONSTRUCTION AND
PROTECTIVE COATING DEFICIENCIES AND FOREIGN MATERIAL IN CONTAINMENT"
TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT, UNIT 2
DOCKET NO. 50-391

1.0 INTRODUCTION

In a letter dated September 7, 2007 (see Agencywide Document Access and Management System Accession No. ML072570676), which references letters dated November 10, 1998, the Tennessee Valley Authority (TVA) submitted a response to U.S. Nuclear Regulatory Commission (NRC) Generic Letter (GL) 1998-04, "Potential for Degradation of the Emergency Core Cooling System and the Containment Spray System after a Loss-of-Coolant Accident because of Construction and Protective Coating Deficiencies and Foreign Material in Containment," for Watts Bar Nuclear Plant (WBN), Unit 2.

2.0 REGULATORY EVALUATION

NRC regulations in Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," require that licensees design their emergency core cooling systems (ECCS) to provide long-term cooling capability so that the core temperature can be maintained at an acceptably low value and decay heat can be removed for the extended period required by the long-lived radioactivity remaining in the core.

Foreign materials, degraded coatings inside the containment that detach from their substrate, and ECCS components not consistent with their design basis, along with loss-of-coolant accident (LOCA) generated debris, are potential common-cause failure mechanisms that may clog suction strainers, sump screens, filters, nozzles, and small-clearance flow paths in the ECCS and safety-related containment spray system (CSS) and thereby interfere with the long-term cooling, source-term, and pressure reduction features of plant design.

Qualified coatings used inside containment should be capable of withstanding the environmental conditions of a postulated design-basis LOCA. Although small, localized areas of degraded coatings may not be indicative of widespread failure of the coatings, the condition of the coatings should be evaluated by suitable means.

The requirements of 10 CFR 50.46(b)(5) and Appendix A to 10 CFR Part 50, Criterion 35, address long-term cooling capability and emergency core cooling, respectively.

Section 50.65 of 10 CFR, "Requirements for monitoring the effectiveness of maintenance at nuclear power plants," (maintenance rule) includes in its scope all safety-related systems, structures, and components (SSCs) and those nonsafety-related SSCs that fall into the following categories: (1) those that are relied upon to mitigate accidents or transients or are used in plant emergency operating procedures, (2) those whose failure could prevent safety-related SSCs from fulfilling their safety-related function, and (3) those whose failure could cause a reactor scram or an actuation of a safety-related system. The pressurized-water reactor sumps are included within the scope of the maintenance rule.

To the extent that protective coatings meet these scoping criteria, they are within the scope of the maintenance rule. The maintenance rule requires that licensees monitor the effectiveness of maintenance for these protective coatings (as discrete systems or components or as part of any SSC) in accordance with paragraph (a)(1) or (a)(2) of 10 CFR 50.65, as appropriate.

3.0 TECHNICAL EVALUATION

In GL 1998-04, dated July 14, 1998, the NRC staff specifically requested that TVA provide the information outlined below for WBN Unit 1.

- (1) A summary description of the plant-specific program or programs implemented to ensure that Service Level I protective coatings used inside the containment are procured, applied, and maintained in compliance with applicable regulatory requirements and the plant-specific licensing basis for the facility. Include a discussion of how the plant-specific program meets the applicable criteria of 10 CFR, Appendix B, as well as information regarding any applicable standards, plant-specific procedures or other guidance used for (a) controlling the procurement of coatings and paints used at the facility; (b) the qualification testing of protective coatings; and (c) surface preparation, application, surveillance, and maintenance activities for protective coatings. Maintenance activities refer to rework of degraded coatings, removing degraded coatings to sound coatings, correctly preparing the surfaces, applying new coating, and verifying the quality of coatings.
- (2) Information demonstrating compliance with item (i) or item (ii).
 - (i) For plants with licensing-basis requirements for tracking the amount of unqualified coatings inside the containment and for assessing the impact of potential coating debris on the operation of safety-related SSCs during a postulated design-basis LOCA, the following information shall be provided to demonstrate compliance:

- (a) The date and findings of the last assessment of coatings and the planned date of the next assessment of coatings.
 - (b) The limit for the amount of unqualified protective coatings allowed in the containment and how this limit is determined. Discuss any conservatism in the method used to determine this limit.
 - (c) If a commercial-grade dedication program is being used at your facility for dedicating commercial-grade coatings for Service Level 1 applications inside the containment, discuss how the program adequately qualifies a coating for Service Level 1. Identify what standards or other guidance are currently being used to dedicate containment coatings at your facility.
- (ii) For plants without the above licensing-basis requirements, information shall be provided to demonstrate compliance with the requirements of 10 CFR 50.46b(5), "Long-term cooling" and the functional capability of the safety-related CSS as set forth in your licensing basis. If a licensee can demonstrate this compliance without quantifying the amount of unqualified coatings, this is acceptable. The following information shall be provided:

If a commercial-grade dedication program is not being used at your facility for qualifying and dedicating commercial-grade coatings for Service Level I applications, provide the regulatory and safety basis for not controlling these coatings in accordance with such a program. Additionally, explain why the facility's licensing basis does not require such a program.

In response to GL 1998-04, TVA provided a letter, dated November 10, 1998 (ML082460076), for WBN Unit 1. This submittal provided the information requested by GL 1998-04.

By letter, dated November 24, 1999 (ML993340510), the NRC staff reviewed the WBN Unit 1 response, concluded that all the requested information was provided, and closed GL 1998-04 for WBN Unit 1.

In letter, dated September 7, 2007, TVA stated that the responses for WBN Unit 1 contained in the letter, dated November 10, 1998, apply to WBN Unit 2, except for the amount of unqualified coatings. TVA stated the following:

The amount of Watts Bar Unit 2 unqualified coatings will be documented as part of the strainer replacement associated with GL 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors". As part of the modification, TVA will perform the necessary containment walkdowns, debris generation study, debris transport analysis, chemical effects and downstream effects analysis. These analyses will verify that the Watts Bar Unit 1 analyses bound Watts Bar Unit 2. TVA will also inspect and repair service level I coatings. The programmatic controls that ensure potential sources of debris introduced into containment will be assessed for potential adverse effects will be put in place prior to fuel load.

The NRC staff has reviewed TVA's response, dated September 7, 2007, and confirmed that the required response for WBN Unit 2 is identical to WBN Unit 1. Since the WBN Unit 1 response was previously accepted by the NRC staff by letter, dated November 24, 1999, the staff finds the response for WBN Unit 2 acceptable.

4.0 CONCLUSION

Staff Requirements Memorandum (SRM), dated July 25, 2007 (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 1998-04 are acceptable since TVA will use the same approved methodology and approach as WBN Unit 1 and will meet the commitment as stated in the letter, dated September 7, 2007.

Principle Contributor: John G. Lamb

Date: February 1, 2010

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Senior Vice President
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/RA/

Patrick D. Milano, Acting Chief
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