

April 23, 2002

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

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 1, RELIEF REQUEST — AMERICAN SOCIETY OF MECHANICAL ENGINEERS, SECTION XI, INSERVICE INSPECTION CODE REPAIR REQUIREMENTS FOR ASME CODE CLASS 3 ESSENTIAL RAW COOLING WATER SYSTEM PIPING (TAC NO. MB3016)

Dear Mr. Scalice:

Tennessee Valley Authority's (TVA's) letter of November 20, 2001, requested relief from the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code), Section XI, requirements regarding repair to a leak in a Class 3, moderate-energy pipe at Watts Bar Unit 1. This letter superseded TVA's earlier submittal of September 26, 2001, which referred to both Generic Letter (GL) 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," and the ASME Code Case N-513, "Evaluation Criteria for Temporary Acceptance of Flaws in Class 3 Piping."

The staff has reviewed TVA's request for relief and finds, through staff's independent GL 90-05 flaw evaluation, that TVA's Code Case 513 flaw evaluation is bounding, and therefore, meets the requirements of GL 90-05. The staff also concludes that the structural integrity of the moderate-energy pipe is adequate for continued operation of the unit until the spring 2002 refueling outage. Further, the staff finds that performing a Code repair on the leaking piping while the unit is operating is impractical.

The staff concludes that the granting of relief where Code requirements are impractical and imposing alternative requirements is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest, given due consideration to the burden upon the licensee and facility that could result if Code

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requirements were imposed on the facility. Pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.55a(g)(6)(i), and consistent with the guidance in GL 90-05, relief is granted through the spring 2002 refueling outage. A copy of our safety evaluation is enclosed.

Sincerely,

/RA/

Thomas Koshy, Acting Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Safety Evaluation

cc w/enclosure: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REQUEST FOR RELIEF FROM

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

CODE REPAIR REQUIREMENTS FOR ASME CODE CLASS 3

ESSENTIAL RAW COOLING WATER SYSTEM PIPING

WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-390

1.0 INTRODUCTION

Watts Bar Unit 1 is in the second period (beginning May 26, 1999) of the first 10-year inservice inspection interval (ending May 26, 2006). The ASME Code of Record is the 1989 Edition (no Addenda) of the Code, Section XI. Tennessee Valley Authority's (TVA's or the licensee's) letter of November 20, 2001, applied Generic Letter (GL) 90-05, "Guidance for Performing Temporary Non-Code Repair of ASME Code Class 1, 2, and 3 Piping," to request relief from the ASME Code, Section XI requirements regarding repair to a leak in a Class 3, moderate-energy pipe at Watts Bar Unit 1. This letter superseded TVA's earlier submittal of September 26, 2001, which referred to both GL 90-05 and the ASME Code Case N-513 "Evaluation Criteria for Temporary Acceptance of flaws in Class 3 Piping." The licensee requested relief until they could make a Code repair during the refueling outage in the spring of 2002.

The leak was detected in a 6-inch nominal pipe size essential raw cooling water (ERCW) system pipe between the ERCW train B main discharge header and the Unit 1/Unit 2 interface isolation valve. The ERCW system has a design temperature of 130°F and pressure of 35 psig. The pipe material is carbon steel, and the nominal wall thickness of the pipe is 0.280 inch. An ultrasonic (UT) examination at the leak location revealed that the flaw is a through-wall hole about 0.25 inch in diameter on the pipe outside diameter and 0.125 inch on the pipe inside diameter. TVA attributed the leak to microbiological induced corrosion. The licensee considered on-line repair of the ERCW piping to be not practical since Watts Bar operators could not isolate the segment of ERCW piping containing the pinhole.

Enclosure

2.0 EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a(g), requires that nuclear power facility piping and components meet the applicable requirements of Section XI of the Code. This section of the Code specifies Code-acceptable repair methods for flaws that exceed Code acceptance limits in piping that is in service. A Code repair is required to restore the structural integrity of flawed Code piping, independent of the operational mode of the plant when the flaw is detected. Those repairs not in compliance with Section XI of the Code are non-Code repairs.

In some circumstances the required Code repair may be impractical unless the facility is shut down. In such cases, the Commission may evaluate determinations of impracticality and may grant relief and impose alternative requirements pursuant to 10 CFR 50.55a(g)(6)(i). GL 90-5 provides guidance to the staff for evaluating relief requests submitted by licensees for temporary non-Code repairs to Code Class 3 piping. TVA's submittal of November 20, 2001, states that the section of piping with the leak is located in a section of piping that cannot be isolated without a plant shutdown to perform a Code repair. The U.S. Nuclear Regulatory Commission (NRC) staff concurs that it is impractical for TVA to comply with the required Code repair, and concludes that shutting down the plant imposes a burden on the licensee.

On November 7, 1991, the Commission issued GL 91-18, "Information to Licensees Regarding Two NRC Inspection Manual Sections on Resolution of Degraded and Nonconforming Conditions and on Operability." This GL and NRC Inspection Manual Part 9900 provided detailed discussions of specific operability determinations, one of which concerned operational leakage. In this regard, Section 6.15 of Part 9900 states the following:

Upon discovery of leakage from a Class 1, 2, or 3 component pressure wall (i.e., pipe wall, valve body, pump casing, etc.) the licensee should declare the component inoperable. The only exception is Class 3 moderate energy piping as discussed in Generic Letter 90-05. For Class 3 moderate energy piping, the licensee may treat the system containing the through-wall flaw(s), evaluated and found to meet the acceptance criteria in Generic Letter 90-05, as operable until relief is obtained from the NRC.

TVA's submittal stated that "The guidance of Generic Letter 90-05 was used. The structural integrity of the flawed piping was assessed and found acceptable." Since the submittal does not contain a flaw evaluation supporting the above stated conclusion, the staff requested TVA to provide additional information regarding this evaluation. TVA sent this information to the NRC on February 15, 2002. However, the staff found that the licensee's evaluation was in accordance with Code Case N-513, rather than being in accordance with GL 90-05. To bridge the disconnect, the staff performed an independent GL 90-05 flaw evaluation using the piping geometry and loading information from the licensee's Code Case N-513 evaluation. The staff has used the "through-wall flaw" approach of the GL for the hole area of the ERCW piping. NRC staff conservatively assumed that the flaw was 0.25-inch long, and that the pipe wall had the Code-required minimum wall thickness, which TVA calculated to be 0.051-inch. The applied stress intensity factor due to the combination of dead weight, pressure, thermal expansion, and seismic loading was calculated by the staff to be 8.35 ksi $\sqrt{\text{in}}$. The assumed fracture toughness was 35 ksi $\sqrt{\text{in}}$, which is suggested in GL 90-05 for ferritic steel. Since the applied stress intensity factor is less than the fracture toughness, the staff concluded that the structural integrity of the ERCW system was adequate for

continued operation of the unit until the spring 2002 refueling outage. This also demonstrated that the Code Case N-513 flaw evaluation bounds the GL 90-05 evaluation for this application.

TVA installed a rubber patch and clamps to stop the leakage from the ERCW pipe hole for housekeeping purposes. Further, the issues of flooding, water spraying on other equipment, and loss of flow were analyzed and found to be insignificant to the operation of the ERCW system. Also, TVA conducted weekly walkdowns for leak monitoring, and has proposed to perform periodic UT inspections every 3 months as specified in GL 90-05.

3.0 CONCLUSIONS

The staff has reviewed the licensee's request for relief and finds, through staff's independent GL 90-05 flaw evaluation, that the licensee's Code Case 513 flaw evaluation is bounding, and therefore, meets the requirements of GL 90-05. Further, the staff finds that performing a Code repair on the leaking ERCW system piping while the unit is operating is impractical. The staff concludes that the granting of relief where Code requirements are impractical and imposing alternative requirements is authorized by law and will not endanger life or property or the common defense and security and is otherwise in the public interest, given due consideration to the burden upon the licensee and facility that could result if Code requirements were imposed on the facility. Pursuant to 10 CFR 50.55a(g)(6)(i) and consistent with the guidance in GL 90-05, relief is granted through the spring 2002 refueling outage.

Principal Contributor: Simon Sheng, NRR

Date: April 23, 2002

Mr. J. A. Scalice
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WATTS BAR NUCLEAR PLANT

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