August 30, 2006

Mr. Karl W. Singer
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 — ONE-TIME REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS SECTION XI CODE REQUIREMENTS - TESTS FOLLOWING REPAIR, MODIFICATION, OR REPLACEMENT (IWE-5221) (TAC NO. MC8920)

Dear Mr. Singer:

By letter to the Nuclear Regulatory Commission (NRC) dated November 17, 2005, the Tennessee Valley Authority (TVA), the licensee for the Watts Bar Nuclear Plant (WBN), Unit 1, submitted a request for relief from Paragraph IWE-5221 "Leakage Test," requirements in Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. TVA submitted the request to use an alternative test method for containment leak testing associated with the steel containment vessel following the Cycle 7 steam generator replacement.

The NRC staff has completed its review of TVA's request and concludes that the proposed alternative is justified on the basis that it would provide an acceptable level of quality and safety. Therefore, the NRC authorizes the proposed alternative pursuant to Title 10, *Code of Federal Regulations,* Section 50.55a, Paragraph (a)(3)(i) for the first 10-year inservice inspection interval at WBN. The proposed alternative is authorized until the end of the unit's Cycle 7 steam generator replacement.

Sincerely,

/RA/

Jennifer Dixon-Herrity, Acting Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Safety Evaluation

cc w/enclosure: See next page

August 30, 2006

Mr. Karl W. Singer
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 — ONE-TIME REQUEST FOR RELIEF FROM AMERICAN SOCIETY OF MECHANICAL ENGINEERS SECTION XI CODE REQUIREMENTS - TESTS FOLLOWING REPAIR, MODIFICATION, OR REPLACEMENT (IWE-5221) (TAC NO. MC8920)

Dear Mr. Singer:

By letter to the Nuclear Regulatory Commission (NRC) dated November 17, 2005, the Tennessee Valley Authority (TVA), the licensee for the Watts Bar Nuclear Plant (WBN), Unit 1, submitted a request for relief from Paragraph IWE-5221 "Leakage Test," requirements in Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code. TVA submitted the request to use an alternative test method for containment leak testing associated with the steel containment vessel following the Cycle 7 steam generator replacement.

The NRC staff has completed its review of TVA's request and concludes that the proposed alternative is justified on the basis that it would provide an acceptable level of quality and safety. Therefore, the NRC authorizes the proposed alternative pursuant to Title 10, *Code of Federal Regulations,* Section 50.55a, Paragraph (a)(3)(i) for the first 10-year inservice inspection interval at WBN. The proposed alternative is authorized until the end of the unit's Cycle 7 steam generator replacement.

Sincerely,

/RA/

Jennifer Dixon-Herrity, Acting Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Safety Evaluation

cc w/enclosure: See next page

DISTRIBUTION:

PUBLIC	LPL2-2 r/f	RidsOgcRp
RidsAcrsAcnwMailCenter	RidsNrrLACSola	RidsNrrDorlDpr
RidsNrrDorlLpl2-2	RidsRgn2MailCenter(MWidmann)	RidsNrrPMDPickett
RidsNrrDeEgcb	S. Samaddar, NRR	

ADAMS Accession No. ML061590111 NRR-028

OFFICE	PM:LPL2-2	LA:LPL2-2	BC:EGCB	OGC	(A)BC:LPL2-2
NAME	DPickett	RSola	RKaras (by memo)	MYoung	JDixon-Herrity
DATE	8/30/06	8/30/06	6/02/06	7/05/06	8/30/06

OFFICIAL RECORD COPY

Mr. Karl W. Singer
Tennessee Valley Authority

WATTS BAR NUCLEAR PLANT

cc:

Mr. Ashok S. Bhatnagar, Senior Vice President
Nuclear Operations
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Larry S. Bryant, Vice President
Nuclear Engineering & Technical Services
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Robert J. Beecken, Vice President
Nuclear Support
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Michael D. Skaggs
Site Vice President
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

General Counsel
Tennessee Valley Authority
ET 11A
400 West Summit Hill Drive
Knoxville, TN 37902

Mr. John C. Fornicola, Manager
Nuclear Assurance and Licensing
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Glenn W. Morris, Manager
Corporate Nuclear Licensing
and Industry Affairs
Tennessee Valley Authority
4X Blue Ridge
1101 Market Street
Chattanooga, TN 37402-2801

Mr. Paul L. Pace, Manager
Licensing and Industry Affairs
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

Mr. Jay Laughlin, Plant Manager
Watts Bar Nuclear Plant
Tennessee Valley Authority
P.O. Box 2000
Spring City, TN 37381

Senior Resident Inspector
Watts Bar Nuclear Plant
U.S. Nuclear Regulatory Commission
1260 Nuclear Plant Road
Spring City, TN 37381

County Executive
375 Church Street
Suite 215
Dayton, TN 37321

County Mayor
P. O. Box 156
Decatur, TN 37322

Mr. Lawrence E. Nanney, Director
Division of Radiological Health
Dept. of Environment & Conservation
Third Floor, L and C Annex
401 Church Street
Nashville, TN 37243-1532

Ms. Ann P. Harris
341 Swing Loop Road
Rockwood, Tennessee 37854

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

LEAKAGE TEST RELIEF REQUEST

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO 50-390

1.0 INTRODUCTION

By letter dated November 17, 2005, the Tennessee Valley Authority (TVA or the licensee) proposed an alternative, which would allow the licensee to perform a local leak rate test of the containment, in lieu of the "Leakage Test" requirements in Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). The leak testing is required as a result of planned repairs to the Watts Bar Nuclear Plant (WBN), Unit 1 steel containment vessel from the scheduled steam generator replacement activity during its Cycle 7 refueling outage. This evaluation addresses the ability of the proposed alternative tests to ensure the continued ability of the steel containment vessel to provide an acceptable level of quality and safety after the steam generator replacement activity.

In a separate but related action, by letter dated August 22, 2006, the staff approved the licensee's request of December 14, 2005 (TS-05-07), for a one-time, 5-year extension to the current 10 year test interval for the performance-based leakage rate test program pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Appendix J, Type A test. The relief request described in this safety evaluation was contingent upon staff approval of TVA's request to extend the 10 year test interval for an additional 5 years.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR, Section 50.55a, Paragraph (a)(3)(i), TVA's letter dated November 17, 2005, requested relief from the leak test methods prescribed by 10 CFR 50.55a and proposed an alternate local leak rate test to meet the leakage test requirements.

Section 50.55a of 10 CFR Part 50 incorporates by reference the 1992 Edition and 1992 Addenda of Section XI of the ASME Code. Paragraph IWE-5221, of Subsection IWE of the ASME Code, requires a leakage rate test following any repair and replacement activity. Paragraph IWE-5221 specifies that the leakage rate test be conducted in accordance with the provision of 10 CFR Part 50, Appendix J, Paragraph IV. A "Containment Modification," which states, in part, "Any major modification, replacement of a component which is part of the primary reactor containment boundary, or resealing a seal-welded door, performed after the preoperational leakage rate test shall be followed by either a Type A, Type B, or Type C test as applicable for the area affected by the modification."

Enclosure

3.0 TECHNICAL EVALUATION

3.1 Specific Relief Request

TVA proposes to perform an "as-left" local leak test on the steel containment vessel (SCV) repair welds in lieu of the Type A, Type B or Type C leakage rate tests as specified by Section XI, Paragraph IWE-5221 of the ASME Code for this type of repair activity.

3.3 Proposed Alternative Duration

The duration of the proposed alternative is through completion and approval of all testing associated with restoration of the containment opening created to support the WBN, Unit 1 steam generator replacement.

3.4 Basis for Relief

The licensee committed to perform the activities described below as a part of the SCV restoration effort. The sections of the SCV that were removed will be re-welded in place in accordance with the 1971, ASME Code, Section III, Winter 1971 Addenda (TVA's Code of Record requirements). A magnetic particle test of the back gouge of the root pass area, along with 100 percent radiography of the final repair weld, will be performed. In addition, a General Visual and a VT-3 examination of the SCV pressure boundary welds will be conducted. To perform a weld leak test, the containment will be pressurized to a test pressure P_a (of at least 15 psig) and held for a minimum of 10 minutes. A bubble test of the repair weld and a VT-2 visual will then be performed with the pressure held at or above 15 psig. A zero leakage criteria will be used for weld acceptance, which is determined by the absence of any bubbles. All personnel performing the testing will meet the requirements of "Qualification and Certification of Nondestructive Testing Personnel," as recommended in SNT-TC-1A 2001 or ANSI/ASNT CP-189.

Based on the above procedure, the licensee states that any local leakage will be directly identified by the bubble test and will confirm the findings of the prior nondestructive examination tests. The combination of the 100 percent radiography, which will show that the repair welds meet the construction code radiography acceptance criteria, and the local leak test of the repair welds, while the SCV and repair welds are at accident pressure, is adequate to prove the structural integrity of the steel containment vessel.

The licensee states that the proposed alternative will continue to provide an acceptable level of quality and safety, and requests NRC approval per 10 CFR 50.55a(a)(3)(i).

3.5 Staff Evaluation

To facilitate the WBN steam generator replacement, the free-standing SCV of WBN will be breached. Two openings will be cut in the SCV in order to remove and replace the steam generators (SGs). The SCV sections removed will be reattached by welding after the steam generator replacement. The ASME Code, Section XI, Paragraph IWE- 5221, requires that leakage rate testing be conducted to ensure the integrity of the repairs prior to returning the SCV to operable status. In lieu of the Type A, Type B or Type C leakage rate testing, the licensee has proposed to perform a series of examinations and a leak test, subjecting the SCV to accident pressure, to verify the leak tightness and integrity of the liner welds and the SCV.

The detailed examination and test sequence are included in the licensee's proposed relief request and summarized herein. The licensee has proposed to perform the activities described below as a part of the SCV restoration effort. The sections of the SCV that were removed will be re-welded in place in accordance with 1971, ASME Code, Section III, Winter 1971 Addenda, TVA's Code of Record requirements. Magnetic particle test of the back gouge of the root pass area along with 100 percent radiography of the final repair weld will be performed. In addition, a General Visual and a VT-3 examination of the SCV pressure boundary welds will be conducted. To perform a weld leak test the containment will be pressurized to a test pressure P_a (of at least 15 psig) and held for a minimum of 10 minutes. A bubble test of the repair weld and a VT-2 visual is then performed with the pressure held at or above 15 psig. A zero leakage criteria will be used for weld acceptance, which is determined by the absence of any bubbles. All personnel performing the testing will meet the requirements of " Qualification and Certification of Nondestructive Testing Personnel" as recommended in SNT-TC-1A 2001 or ANSI/ASNT CP-189.

The magnetic particle testing and the 100 percent radiography of the repair weld, followed by the bubble test, will provide adequate assurance that the repair welds do not leak or have any structural defects. The zero leakage acceptance criteria for the bubble test will ensure that the SCV leakage rate is not altered by the SG replacement activity and the pressurization of the SCV to the accident pressure will confirm the integrity of the SCV after the repair. Therefore, the proposed alternative will provide adequate assurance of structural integrity.

4.0 CONCLUSION

On the basis of the information provided in the relief request, the NRC staff concludes that the proposed alternative to the requirements of Paragraph IWE-5221 will provide an acceptable level of quality and safety.

Therefore, pursuant to 10 CFR 50.55a(a)(3(i)), the NRC authorizes the use of this relief request during the licensee's steam generator replacement program scheduled during the Cycle 7 Refueling Outage of WBN, Unit 1.

Principal Contributor: S. Samaddar

Date: August 30, 2006