

February 9, 2001

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

SUBJECT: BROWNS FERRY UNITS 2 AND 3 INSERVICE INSPECTION (ISI) RELIEF  
FROM ASME CODE, SECTION XI REQUIREMENTS FOR SECOND 10-YEAR  
INSPECTION INTERVAL (TAC NOS. MB0146 AND MB0147)

Dear Mr. Scalice:

By letter dated October 12, 2000, the Tennessee Valley Authority, licensee for Browns Ferry Nuclear Plant, Units 2 and 3, submitted requests for relief (2-SPT-14 and 3-SPT-8, respectively) from certain requirements of the ASME Code, Section XI and Code Case N-498-1 regarding the 4-hour hold time at nominal operating pressure prior to visual examination during hydrostatic testing of portions of the high-pressure coolant injection (HPCI) line, including the HPCI turbine exhaust, vents and drains to the suppression chamber, for the second 10-year ISI interval. Due to operational limitations on the suppression chamber, the licensee requested relief from the Code-required hydrostatic test with a 4-hour hold time and proposed an alternative system functional pressure test with a 10-minute hold time.

The staff has found your request to be acceptable, and therefore, authorizes the proposed alternative pursuant to 10 CFR 50.55a(a)(3)(ii). The staff's Safety Evaluation is enclosed. If you have any questions regarding this action, please contact Bill Long at 301-415-3026.

Sincerely,

*/RA/*

Richard P. Correia, Chief, Section 2  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-260 and 50-296

Enclosure: Safety Evaluation

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
SECOND 10-YEAR INTERVAL INSERVICE INSPECTION (ISI) PROGRAM  
REQUEST FOR RELIEF FROM ASME CODE, SECTION XI REQUIREMENTS  
BROWNS FERRY NUCLEAR PLANT, UNIT NOS. 2 AND 3  
TENNESSEE VALLEY AUTHORITY  
DOCKET NUMBERS 50-260 AND 50-296

1.0 INTRODUCTION

The ISI of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code (Code) and applicable addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable editions of the ASME Code, Section XI, for the second 10-year ISI interval of Browns Ferry, Units 2 and 3, are the 1986 Edition and the 1989 Edition, respectively.

By letter dated October 12, 2000, Tennessee Valley Authority (TVA), the licensee for Browns Ferry Nuclear Plant, Units 2 and 3, submitted requests for relief (2-SPT-14 and 3-SPT-8) from certain requirements of the applicable ASME Code, Section XI and Code Case N-498-1 regarding the 4-hour hold time at nominal operating pressure prior to visual examination during hydrostatic testing of portions of high-pressure coolant injection (HPCI) line, including the HPCI turbine exhaust, vents and drains to the suppression chamber, for the second 10-year ISI interval of Browns Ferry, Units 2 and 3. TVA requested relief from the Code-required hydrostatic test with a 4-hour hold time and proposed to perform a system functional pressure test with a 10-minute hold time due to operational limitations on the suppression chamber.

The staff has evaluated the licensee's request for relief pursuant to 10 CFR 50.55a(a)(3)(ii) for the second 10-year ISI interval of Browns Ferry, Units 2 and 3.

ENCLOSURE

## 2.0 DISCUSSION

### Identification of System

The proposed relief applies to the HPCI system extending from the steam admission valve through the HPCI turbine and the turbine exhaust piping to the suppression chamber and the associated drains and vent lines.

### Code Requirements

ASME Code, Section XI, 1986 Edition, and the 1989 Edition, Table IWC-2500-1, Examination Category C-H, Item numbers C7.20, C7.40, C7.60, and C7.80 require a VT-2 visual examination during a system hydrostatic test once every 10-year ISI interval. Subsection IWA-5213(d) requires a 4-hour hold time for insulated systems, and a 10-minute hold time for non-insulated systems or components after attaining the test pressure and temperature conditions prior to performing the VT-2 visual examination.

Code Case N-498-1, approved for use by NRC in Regulatory Guide 1.147, allows performance of a system leakage test in lieu of the hydrostatic test of the above system but also requires pressurization for a minimum of 4 hours for insulated systems and 10 minutes for non-insulated systems at nominal operating pressure prior to performing the VT-2 visual examination.

### Licensee's Requested Relief

Relief is requested from maintaining the 4-hour holding time at test pressure required by the Code in subsection IWA-5213(d) and also in Code Case N-498-1 for the subject system.

### Licensee's Proposed Alternative

As an alternative to the hydrostatic test, TVA is proposing that a system functional pressure test be performed on this section of piping in accordance with subsections IWC-5210(a)(1) and IWA-5211(b). This would provide all the normal pressure test program provisions for this examination; however, instead of the 4-hour hold time, a 10-minute hold time would be required.

### Licensee's Basis for Relief

This relief is being requested in accordance with 10 CFR 50.55a(a)(3)(ii), as a hardship or unusual difficulty in complying with the specified requirements, without a compensating increase in the level of quality and safety.

Performance of a 5-hour test (4-hour hold time and 1-hour examination) on the HPCI run while the reactor is at power would reduce the steam condensation capabilities of the suppression pool and seriously challenge the heat limitations imposed on the suppression pool water even with both loops of residual heat removal (RHR) in suppression pool cooling. It would also challenge the control of suppression pool water level as well as drywell to suppression chamber differential pressure.

Performance of a water solid test for this section of piping is not considered practical or feasible since the HPCI turbine exhaust piping is not designed for the weight of a water solid condition.

### 3.0 EVALUATION

Both the Code and Code Case N-498-1 specify pressure tests that require a 4-hour hold time prior to performing the VT-2 visual examination during the hydrostatic test of insulated systems. The licensee has stated that compliance with the 4-hour hold time will result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The licensee has further stated that performance of the test for 5 hours (4-hour hold time and 1-hour examination) duration could compromise plant safety.

Based on the review of information provided, the staff believes that in order to maintain suppression pool temperature within the Technical Specification limits, the pressure test and the 4-hour hold time for the subject system would require dedicated operation of the RHR system in the suppression pool cooling mode while the reactor is at power. Furthermore, due to exhaust of steam from the HPCI turbine into the suppression pool, the steam condensation capability of the suppression pool will be reduced. Therefore, should an actual plant emergency occur during the test, the ability to bring the plant to a safe shutdown condition could be compromised.

Within each 10-year inspection interval, a system functional test at operating pressure, including a VT-2 visual examination, is conducted on the system at 40-month intervals in accordance with the Code. At or near the end of each inspection interval, the Code requires a hydrostatic test, which by virtue of Code Case N-498-1 can be a system leakage test requiring pressurization to nominal operating pressure for at least 4 hours prior to the VT-2 visual examination. However, the licensee's proposed alternative would allow performance of the system functional test with pressurization for at least 10 minutes at nominal operating pressure without removal of the insulation in lieu of a 4-hour hold time at this pressure prior to the VT-2 visual examination.

The piping and components subject to the VT-2 visual examination contain steam. The staff believes that steam leaks are more easily detectable than comparable water leaks from insulated components. Therefore, for these components, a reduced hold time for steam piping at nominal operating pressure without removal of the insulation prior to performing VT-2 visual examination is expected to permit detection of leakage. The Class 2 HPCI steam supply piping from the outboard primary containment isolation valve to the steam admission flow control valve located near the HPCI turbine is not a part of this relief request since the piping is normally pressurized to full reactor pressure and, therefore, can meet the 4-hour pressurized hold time requirement prior to the VT-2 visual examination. The piping included in this relief are the portions extending from the steam admission valve through the HPCI turbine and the turbine exhaust piping to the suppression chamber along with the associated drains and vent lines. In an unlikely event of missing a very small leak during a system functional test, the leak can be detected during maintenance activities requiring pump/turbine operation for post maintenance testing or the next system functional test. Further, assuming reasonable crack growth between consecutive tests for the portion of subject piping that is at system pressure during normal plant operation, the system will also remain functional in spite of a leak. Compliance with the Code

requirement would require removal of insulation from hundreds of feet of piping, conduct of the test, and replacement of the insulation following the test. This would result in hardship to the licensee without a compensating increase in the level of quality and safety.

#### 4.0 CONCLUSION

The staff concludes that for HPCI turbine inlet and exhaust piping to the suppression pool and the associated drains and vents, maintaining a 4-hour hold time at nominal operating pressure prior to the VT-2 visual examination during a system pressure test challenges the heat limitations of the suppression pool and, thus, creates an operational safety concern. A system functional test at nominal operating pressure with a 10-minute hold time at pressure without removal of the insulation prior to performing the VT-2 visual examination will provide reasonable assurance of leaktight integrity of the subject system. In addition, the staff considers the removal and subsequent reinstallation of insulation for the sole purpose of complying with the requirements of the applicable Code and Code Case N-498-1 to be a hardship without a compensating increase in the level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(a)(3)(ii), the licensee's proposed alternative is authorized for the second 10-year ISI interval of Browns Ferry Nuclear Plant, Unit Nos. 2 and 3.

Principal Contributor: P. Patriak, NRR/DE/EMEB

Date: February 9, 2001

Mr. J. A. Scalice  
Tennessee Valley Authority

**BROWNS FERRY NUCLEAR PLANT**

cc:

Mr. Karl W. Singer, Senior Vice President  
Nuclear Operations  
Tennessee Valley Authority  
6A Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Mr. Mark J. Burzynski, Manager  
Nuclear Licensing  
Tennessee Valley Authority  
4X Blue Ridge  
1101 Market Street  
Chattanooga, TN 37402-2801

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

Mr. Timothy E. Abney, Manager  
Licensing and Industry Affairs  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609

Mr. John T. Herron, Site Vice President  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609

Senior Resident Inspector  
U.S. Nuclear Regulatory Commission  
Browns Ferry Nuclear Plant  
10833 Shaw Road  
Athens, AL 35611

General Counsel  
Tennessee Valley Authority  
ET 10H  
400 West Summit Hill Drive  
Knoxville, TN 37902

State Health Officer  
Alabama Dept. of Public Health  
RSA Tower - Administration  
Suite 1552  
P.O. Box 303017  
Montgomery, AL 36130-3017

Mr. Robert J. Adney, General Manager  
Nuclear Assurance  
Tennessee Valley Authority  
5M Lookout Place  
1101 Market Street  
Chattanooga, TN 37402-2801

Chairman  
Limestone County Commission  
310 West Washington Street  
Athens, AL 35611

Mr. Ashok S. Bhatnagar, Plant Manager  
Browns Ferry Nuclear Plant  
Tennessee Valley Authority  
P.O. Box 2000  
Decatur, AL 35609