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

April 6, 2016

Mr. Joseph W. Shea
Vice President, Nuclear Licensing
Tennessee Valley Authority
1101 Market Street, LP 3D-C
Chattanooga, TN 37402-2801

SUBJECT: WATTS BAR NUCLEAR PLANT, UNIT 2 – ALTERNATIVE TO THE TESTING REQUIREMENTS OF AMERICAN SOCIETY OF MECHANICAL ENGINEERS OPERATION AND MAINTENANCE CODE FOR CLASS 1 SAFETY VALVES (IST-RR-05) (CAC NO. MF7396)

Dear Mr. Shea:

By letter dated February 23, 2016 (Agencywide Documents Access and Management System Accession No. ML16054A586), Tennessee Valley Authority (TVA) submitted alternative request IST-RR-5 to the U.S. Nuclear Regulatory Commission (NRC). TVA is proposing an alternative to certain requirements of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), for the inservice testing (IST) program at the Watts Bar Nuclear Plant, Unit 2 (WBN2) for the preservice test period. TVA is requesting relief from the ASME OM Code, Mandatory Appendix I, Section I-7210, "Class 1 Safety Valves," requirement to verify the set-pressures, within 6 months before initial reactor criticality, for the following WBN2 pressurizer safety valves (PSVs) 2-RFV-68-563, 2-RFV-68-564, and 2-RFV-68-565. TVA has proposed to extend the time period for compliance with Appendix I, Section I-7210 from within 6 months (April 13, 2016) to within 9 months (July 13, 2016) before initial reactor criticality.

The NRC staff has determined that the proposed alternative request IST-RR-5 for WBN2, provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that TVA has adequately addressed all of the regulatory requirements set forth in Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 55a(z)(1) for this alternative. Therefore, pursuant to 10 CFR 50.55a(z)(1) the NRC staff authorizes alternative request IST-RR-5 for WBN2 for the first 10-year IST program interval including the preservice period. However, the authorization is not valid if initial criticality occurs beyond July 13, 2016 (i.e., 9 months from the date that the valves were last tested). TVA has agreed that if initial criticality occurs beyond 9 months from the date of the last set pressure test, the pressurizer PSVs will be retested within 6 months prior to the actual initial criticality date.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject request remain applicable.

If you have any questions, please contact the Project Manager, Robert Schaaf at 301-415-6020.

Sincerely,

Benjamin G. Beasley, Chief
Plant Licensing Branch II-2
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 RELIEF REQUEST IST-RR-5 FOR THE

PRESERVICE TEST PERIOD OF THE INSERVICE TESTING PROGRAM

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-391

1.0 INTRODUCTION

By letter dated February 23, 2016 (Agencywide Documents Access and Management System Accession No. ML16054A586), Tennessee Valley Authority (TVA, the licensee) submitted alternative request IST-RR-5 to the U.S. Nuclear Regulatory Commission (NRC), proposing alternatives to certain requirements of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), for the inservice testing (IST) program at Watts Bar Nuclear Plant, Unit 2 (WBN2) for the preservice test period. The preservice test period is the period of time following completion of construction activities related to a component and before first electrical generation by nuclear heat.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 55a(z)(1), the licensee requested to use the proposed alternative in IST-RR-5 on the basis that the alternative provides an acceptable level of quality and safety. TVA is requesting relief from the ASME OM Code, Mandatory Appendix I, Section I-7210, "Class 1 Safety Valves," requirement to verify the set-pressures, within 6 months before initial reactor criticality, for the following WBN2 pressurizer safety valves (PSVs) 2-RFV-68-563, 2-RFV-68-564, and 2-RFV-68-565. TVA has proposed to extend the time period for compliance with Appendix I, Section I-7210 from within 6 months (April 13, 2016) to within 9 months (July 13, 2016) before initial reactor criticality.

2.0 REGULATORY EVALUATION

The regulation at 10 CFR 50.55a(f), *Inservice testing requirements*, requires, in part, that IST of certain ASME Code Class 1, 2, and 3 components must meet the requirements of the ASME OM Code and applicable addenda, except where alternatives have been authorized pursuant to paragraphs 10 CFR 50.55a(z)(1) or 10 CFR 50.55a(z)(2).

The regulations at 10 CFR 50.55a(z), *Alternatives to codes and standards requirements,* state, in part, that alternatives to the requirements of 10 CFR 50.55a(f) may be authorized by the NRC if the licensee demonstrates that: (1) the proposed alternative provides an acceptable level of quality and safety, or (2) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. In accordance with 10 CFR 50.55a(z)(1), Relief Request IST-RR-5 stated that the proposed alternatives would provide an acceptable level of quality and safety.

Based on the above, and subject to the NRC's findings with respect to authorizing the proposed alternatives to the ASME OM Code given below, the NRC staff concludes that regulatory authority exists for the licensee to request and the Commission to authorize the alternatives requested by the licensee.

3.0 TECHNICAL EVALUATION FOR ALTERNATIVE REQUEST IST-RR-5

Applicable Code Edition and Addenda

The applicable ASME OM Code Edition for the first WBN2 10-year IST program interval including the preservice test period is the 2004 Edition through 2006 Addenda.

Applicable Code Requirement

Mandatory Appendix I, Section I-7200, *Testing Before Initial Electric Power Generation*

Mandatory Appendix I, Section I-7210, *Class 1 Safety Valves*: "Within 6 months before initial reactor criticality, each valve shall have its set-pressure verified."

Reason for Request

Relief is being requested from the requirement to verify set-pressures for the following WBN2 PSVs within 6 months before initial reactor criticality.

2-RFV-68-563	2-RFV-68-564	2-RFV-68-565

Specifically, TVA is requesting that the ASME OM Code, Mandatory Appendix I, Section I-7210 requirement to test the PSVs within 6 months of initial criticality be extended to 9 months before initial criticality.

This alternative request would extend the time period for compliance with Section I-7210 from April 13, 2016 (i.e., 6 months from the date that the PSVs were last tested) to July 13, 2016. TVA requests the contingency of extending the due date for compliance with Section I-7210 in order to have additional schedule margin to reduce the potential effect on other plant activities and reduce the risk of having to regress the plant operating mode in order to perform the required testing should the initial criticality date exceed April 13, 2016.

Proposed Alternative

TVA proposes a contingency to extend the time interval for verifying set-pressure testing of the WBN2 PSVs prior to initial reactor criticality from 6 months to 9 months. If it becomes

necessary to utilize this extension, TVA will remove and test (or replace with pretested valves) the WBN2 PSVs at the first refueling outage. If WBN2 is able to achieve initial criticality by April 13, 2016, then this relief request will not be implemented and testing at the first refueling outage will be in accordance with the ASME OM Code requirements.

The WBN2 PSVs 2-RFV-68-563, 2-RFV-68-564, and 2-RFV-68-565 have a design set pressure of 2485 pounds per square inch gauge and were as-left tested at the vendor's facility on April 29, 2011, April 28, 2011, and May 3, 2011, respectively. After installing the PSVs and performing hot functional testing, TVA removed the valves and sent them to an off-site test facility where they were retested on October 14, October 15, and October 13, 2015, respectively. The as-found set pressures were within the ASME OM Code, Mandatory Appendix I, Section I-1320 allowed 3 percent tolerance for as-found set pressure.

The test data from 2011 and 2015 provide high confidence that the set pressures for these valves will remain within the allowable OM Code tolerances until the first WBN2 refueling outage (currently scheduled for October 9, 2017).

The WBN2 PSVs are a proven design considering that they are interchangeable with the PSVs at WBN1 and Sequoyah Nuclear Plant, Units 1 and 2. Additionally, the pressurizer relief system configurations are similar among these units.

To verify set pressures would require TVA to either replace the PSVs with pretested valves, or remove and test the PSVs at an off-site facility. Either option would require intensive work in a short time, affect other work and test activities currently underway, and could delay startup of WBN2 by causing a regression in plant status to a lower operating mode.

OM Code, Mandatory Appendix I, Section I-1320(a) requires 20 percent of these valves to be tested within any 24-month period and all valves to be tested within 5 years. Potentially extending the time period for testing before initial criticality from 6 months to 9 months will not affect that requirement. If the extension is applied and the first refueling outage is scheduled for October 9, 2017, the PSVs will be tested within 24 months, which would exceed the OM Code requirement to test 20 percent of the valves with in any 24-month period and would also meet the OM Code requirement to test all of the valves within 5 years. Testing the PSVs at the first refueling outage (if required) would provide additional assurance that the PSVs will remain within the OM Code allowed 3-percent tolerance for as-found set pressure. Therefore, the OM Code requirements for percentages and frequency will be met.

NRC Staff Evaluation

OM Code imposes a set-pressure verification requirement for Class 1 safety relief valves (SRVs) that is unique to the preservice phase of a nuclear power plant. That is, the SRVs must be set-pressure tested within 6 months prior to initial reactor criticality. This criteria is stricter than the periodic test frequency requirements that apply during the operational phase of a nuclear power plant wherein the valves must all be tested at least once every 5 years and at least 20 percent of the valves must be tested in any 24-month interval. The stricter preservice requirements have to do with the fact that the valves are new components and the system in which they are installed may well be a new design, and therefore, some extra assurance is desirable.

However, the 6-month preservice verification criteria can present significant schedule challenges for a plant, especially for the pressurizer SRVs, as these valves must be removed and rigged out of the plant, shipped to a qualified test facility, tested, returned and reinstalled. TVA has proposed an alternative that would mitigate the schedule risk by relaxing the 6-month preservice requirement for set-pressure verification to a maximum of 9 months. If initial criticality is achieved by April 13, 2016, then the valves will have met the 6-month preservice set-pressure verification requirement and no alternative is required. If initial criticality is achieved sometime between April 13, 2016, and July 13, 2016 (i.e., an extension of up to 3 months), the valves will be deemed to have met their preservice set pressure verification requirement, however, all three PSVs will be tested (or replaced with pretested valves) at the first refueling outage. If initial criticality slips beyond July 13, 2016, the required preservice set pressure verification will be re-performed prior to initial criticality and no alternative is required.

TVA presented set-pressure test data for the subject valves demonstrating, that almost over a 5-year period including service during hot functional testing, the valves were able to maintain a setpoint drift of less than ±3 percent, which is the OM Code performance expectation. TVA also noted that these valves are of a proven design that has been used elsewhere for many years in similar steam supply systems. In view of this information, the NRC staff has concluded that adding up to 3 months to the OM Code preservice set-pressure verification criteria should present a minimal increase in risk, especially considering that if this alternative is invoked, the valves will all be tested at the first refueling outage, which is sooner than the code would otherwise require testing. TVA's proposed alternative provides reasonable assurance of the operational readiness of the PSVs. Therefore, the proposed alternative provides an acceptable level of quality and safety.

4.0 CONCLUSION

As set forth above, the NRC staff determined that for alternative request IST-RR-5 for WBN2, the proposed alternative provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for request IST-RR-5 for WBN2. Therefore, the NRC staff authorizes alternative request IST-RR-5 for WBN2 for the first 10-year IST program interval including the preservice period. However, the authorization is not valid if initial criticality occurs beyond July 13, 2016 (i.e., 9 months from the date that the valves were last tested). TVA has agreed that if initial criticality occurs beyond 9 months from the date of the last set pressure test, the pressurizer SRVs will be retested within 6 months prior to the actual initial criticality date.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject request remain applicable.

Principal Contributor: John Billerbeck

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If you have any questions, please contact the Project Manager, Robert Schaaf at 301-415-6020.

Sincerely,

/RA/

Benjamin G. Beasley, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-391

Enclosure:
Safety Evaluation

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