Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

William R. Lagergren, Jr.
Site Vice President, Watts Bar Nuclear Plant

NOV 16 2000

10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT - TECHNICAL SPECIFICATION (TS) CHANGE NO. 00-06 - INCREASE UNIT 1 REACTOR POWER TO 3459 MWt - PROPOSED LICENSE CONDITION FOR REACTOR VESSEL FLUENCE ISSUE (TAC NOs. MA9152 and MA89606)

In accordance with the provisions of 10 CFR 50.90, the purpose of this letter is to provide additional information related to the subject power uprate and request an amendment to WBN Unit 1 Operating License NPF-90 to provide a proposed license condition. As recently discussed with the NRC Staff, the proposed license condition (Enclosure 1) addresses TVA's commitment to perform supplemental reactor vessel specimen structural toughness testing and associated analyses.

TVA's license amendment request for the 1.4% power uprate dated June 7, 2000, and subsequent response to staff questions dated August 24, 2000, concluded that the existing neutron fluence exposure projections for the reactor vessel bound the corresponding fluence projections for the 1.4% uprate conditions. In addition, the projected reactor vessel fluence associated with TVA's imminent tritium production proposal is also bounded by current vessel fluence analysis assumptions. However, as discussed and requested by NRC, the nature of these major licensing initiatives requires additional NRC evaluation to resolve WBN Unit 1 Reactor Vessel Integrity issues documented in WBN SSER 14 and discussed at a TVA/NRC meeting at NRR Headquarters on February 9, 2000. This issue is discussed further below.

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BACKGROUND:

The intermediate shell forging (Forging #5) of the Watts Bar Unit 1 Reactor Vessel had an initial upper shelf energy (USE) of 62 ft-lbs determined by Charpy testing of unirradiated material. Appendix G of 10 CFR 50 requires an initial USE of 75 ft-lbs with an end of life (EOL) USE of at least 50 ft-lbs. When these criteria are not met, Appendix G provides alternatives such as the Equivalent Safety Margins Analysis (ESMA) which TVA elected to use prior to Unit 1 licensing. Because the Watts Bar Reactor Vessel is made of foreign steel and the ESMA is based on material properties of domestic steel, NRC has questioned the applicability of the ESMA for the Watts Bar Reactor Vessel.

PROPOSED RESOLUTION:

To resolve this issue, TVA proposes that the ½T compact tensile (CT) specimens from WBN Reactor Vessel Capsules W and X be tested in accordance with an NRC approved procedure for fracture toughness testing. The basis for using Capsules W and X is that Capsule W reflects the fluence at the ¼T location at EOL (32 effective full power years) and Capsule X reflects the fluence at the vessel/cladding interface at EOL. These two data points provide the best indication of material properties of the Reactor Vessel at the design EOL which is the time of greatest interest related to the material fracture toughness. Three specimens will be tested from each capsule. Capsule W was pulled at refueling outage (RFO) 3 and Capsule X will be pulled at RFO 5 such that the results of J-R testing for both capsules will be submitted to NRC before the Reactor Vessel has been in service for 8 EFPYs. This schedule precedes the 50 ft-lbs at 8.6 EFPYs projected from the initial USE of 62 ft-lbs.

In order to demonstrate acceptability of the proposed test procedure for the irradiated specimens, a demonstration test(s) with unirradiated material similar to the Watts Bar forging 05 will be performed. This demonstration test will involve a comparison of test data using the proposed procedure with test data using an ASTM standard procedure. Prior to the performance of any testing or work on the irradiated specimens, TVA will provide NRC with the test results from the performance demonstration test(s) and submit the proposed test procedure for the irradiated specimens for the staff's review and approval. Upon NRC approval of the proposed test procedure, TVA will perform the subject testing of irradiated specimens for capsules W and X, as described above.

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TVA proposes testing of the Capsule W CT specimens with the results of the CT specimen testing to be included with the report for the other Charpy, tension, and dosimetry specimens that make up the capsule. TVA will submit the supplemental testing results with an evaluation of the effect of that testing on the ESMA along with the 10 CFR 50 Appendix H required testing report assuming that the procedure for performing J-R testing of the Watts Bar CT specimens is approved by NRC expeditiously. The supplemental testing results from the specimens in Capsule X will also be submitted with the Capsule X testing report required in 10 CFR 50 Appendix H.

If the data evaluation does not verify the equivalent margins analysis, a revised analysis based on the J-R testing data from Capsules W and X will be performed. This revised analysis will identify the amount of time and neutron fluence for which the reactor vessel is acceptable for continued operation in accordance with the requirements of 10 CFR 50, Appendix G.

As requested by the Staff, NRC will be verbally notified of the schedule for the performance demonstration test and the schedule for the supplemental testing for Capsule W specimens in sufficient time to allow the Staff to observe the tests.

TVA has determined that the previous determination that there are no significant hazards considerations associated with the proposed power uprate LAR remains valid for the proposed license condition.

In accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Tennessee State Department of Public Health.

Enclosure 2 provides a summary of the commitments for this submittal. Should you have any questions, please contact P. L. Pace at (423) 365-1824.

Sincerely,

FOR W. R. Lagergren, Jr.,
Enclosures
cc (See Page 4)

Subscribed and sworn to before me
on this 16th day of November 2000.

E. Jeannette Long
Notary Public

My Commission Expires June 27, 2001

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cc (Enclosures):
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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1 - DOCKET 390

PROPOSED LICENSE CONDITION

INSERT THE FOLLOWING LICENSE CONDITION IN SECTION 3.C OF WBN UNIT 1 OPERATING LICENSE NPF-90:

(5) Reactor Vessel Fracture Toughness Testing

Supplemental fracture toughness testing (J-R) will be performed in accordance with a testing procedure that has been previously reviewed and approved by the NRC staff on Surveillance Capsule W specimens (removed from Cycle 3 Refueling Outage) and Capsule X specimens (to be removed from Cycle 5 Refueling Outage). The supplemental test results will be included in the report to be submitted in accordance with 10 CFR 50, Appendix H requirements for each Capsule specimen and will include an evaluation of the effects on TVA's equivalent margins analysis which was submitted October 15, 1993 and approved by NRC in Supplemental Safety Evaluation Report (SSER) 14.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1 - DOCKET 390

SUMMARY OF COMMITMENTS

TVA will perform supplemental reactor vessel fracture toughness testing in accordance with WBN Operating License Condition No. 5, as discussed in this letter.