



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

OCT 18 1999

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

Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - CHANGES MADE TO THE WBN
TECHNICAL SPECIFICATION BASES AND TECHNICAL REQUIREMENTS MANUAL

The purpose of this letter is to provide the NRC with copies of changes to the WBN Technical Specification Bases (TS Bases) and WBN Technical Requirements Manual (TRM) in accordance with WBN TS Section 5.6, "TS Bases Control Program," and WBN TRM Section 5.1, "Technical Requirements Control Program," respectively. These changes have been implemented at WBN during the period since WBN's last update (February 9, 1998) and meet criteria described within the above control programs for which prior NRC approval is not required. Both control programs require such changes to be provided to the NRC on a frequency consistent with 10 CFR 50.71(e). WBN's FSAR update in accordance with 10 CFR 50.71(e) is being provided under separate cover. In addition, this letter provides a replacement table of contents including an effective page listing for the WBN Technical Specifications (TS), the TS Bases, and the TRM.

Enclosure 1 provides the WBN TS Table of Contents and List of Effective Pages. Enclosure 2 provides the Table of Contents and List of Effective Pages for the TS Bases and the changes to the TS Bases addressed above. Note that changes made to the TS Bases under approved license amendments to the WBN TS are not included unless necessary for page integrity. Enclosure 3 provides the Table of Contents and List of Effective Pages for the WBN TRM and the changes to the TRM addressed above. The attachment to Enclosure 3 provides changed TRM pages made during this reporting period which were

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superseded by the changes provided under Enclosure 3. The changed pages in each of the enclosures (excluding the attachment to Enclosure 3) should be inserted into the subject documents and superseded pages removed.

If you have any questions, please contact me at (423) 365-1824.

Sincerely,



P. L. Pace, Manager
Licensing and Industry Affairs

Enclosure

cc (Enclosure):

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ENCLOSURE 1 TABLE OF CONTENTS AND LIST OF
EFFECTIVE PAGES WBN TECHNICAL SPECIFICATIONS

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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1
DOCKET NO. 390

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS-98-005
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

I. DESCRIPTION OF THE PROPOSED CHANGE

The proposed license amendment would revise the Watts Bar Nuclear Plant (WBN) Unit 1 Technical Specifications (TS) analytical methods for core operating limits to implement a new methodology supporting a more negative end of life (EOL) Moderator Temperature Coefficient (MTC). This TS change includes a Westinghouse Electric Corporation analysis which proposes a relaxation of the Limiting Condition for Operation (LCO) and Surveillance Requirement (SR) MTC TS values for the end of cycle, rated thermal power condition. This methodology (WCAP-15088-P, Rev.1) is WBN specific and removes overly restrictive assumptions regarding derivation of EOL TS limits for MTC. The WCAP will be referenced in TS Section 5.9.5(b) for the Core Operating Limits Report. Upon approval, the COLR for WBN Unit 1 will be revised and submitted as required by TS 5.9.5(d).

Specifically, as illustrated by the markup of the current WBN TS in Enclosure 2, the analytical methods used to determine the core operating limits in TS Section 5.9.5(b) will be revised to add the following:

- "5. WCAP-15088-P, Rev.1, "Safety Evaluation Supporting A More Negative EOL Moderator Temperature Coefficient Technical Specification for the Watts Bar Nuclear Plant," July 1999. (W Proprietary). (Methodology for Specification 3.1.4 - Moderator Temperature Coefficient.)"

II. REASON FOR THE PROPOSED CHANGE

The FSAR accident analyses upon which the Technical Specification limits on Moderator Temperature Coefficient (MTC) are based have assumed bounding values of the Moderator Density Coefficient (MDC) in order to ensure a conservative simulation of plant transient response for Watts Bar. For those transients for which the analysis results are made more severe by assuming maximum moderator feedback, a MDC of $0.43 \Delta k/k/gm/cc$ has been assumed to exist throughout the transient. The current basis for converting from the accident analysis MDC value to a Technical Specification

LCO MTC value is overly restrictive. The concept termed the "Most Negative Feasible MTC" approach is proposed as an alternative method of determination of the TS limits on MTC. This approach is described in detail in WCAP-15088, Rev. 1 (Enclosure 4). The methodology maintains the existing accident analysis assumption of a bounding value of moderator coefficient, but offers an alternative method for converting to the Technical Specification LCO MTC value. This methodology as presented in the WBN specific WCAP, is similar to that approved for use at other nuclear power plants such as Sequoyah Units 1 and 2, South Texas Project, Vogtle, and Farley.

The WBN TS place both an LCO and a Surveillance Requirement (SR) constraint on the MTC, based on the accident analyses assumptions on the MDC. The most negative MTC LCO limit applies to Modes 1, 2, and 3, and requires that the MTC be less negative than the specified limit value for the all rods withdrawn, end of cycle life, rated thermal power condition.

The Technical Specification SR requires measurement of the MTC prior to EOL (after a 300 ppm equivalent RTP - ARO equilibrium boron concentration has been attained). The 300 ppm SR MTC value differs from the EOL LCO limit value. Because the HFP MTC value will gradually become more negative with further core depletion and boron concentration reduction, a 300 ppm SR value of MTC should necessarily be less negative than the EOL LCO limit. The 300 ppm SR value is sufficiently less negative than the EOL LCO limit value to provide assurance that the LCO limit will be met when the 300 ppm surveillance criterion is met. If the MTC measured for the 300 ppm SR is more negative than the 300 ppm Surveillance limit listed in the COLR, the WBN TS requires that the measurement must be repeated once per 14 EFPD during the remainder of the cycle. (Note: The WBN TS allow that if, at an equivalent RTP - ARO equilibrium boron concentration of less than or equal to 60 ppm, the measured MTC is less negative than the 60 ppm Surveillance limit in the COLR, the measurement need not be repeated.)

The repeating of MTC surveillance measurements every 14 EFPD until 60 ppm is reached is undesirable because it requires perturbing normal reactor operation. In addition, if the current EOL MTC limit of $-40 \text{ pcm}/^\circ\text{F}$ is exceeded, the unit must be placed in Hot Shutdown within 12 hours per Technical Specification Action 3.1.4.C. Higher fuel enrichments and longer cycles tend to cause the end of life (EOL) moderator temperature coefficient (MTC) to become more negative. This trend makes it likely that for the current WBN Unit 1 cycle (Cycle 3) or some future cycle, the 300 ppm measured value will be more negative than the surveillance limit. To reduce the probability of failing the 300 ppm surveillance measurement, which would require MTC measurements every 14 EFPD at least until 60 ppm is reached, the proposed WBN TS change would implement the alternative method of determination of the MTC limits based on the analysis provided in WCAP-15088, Rev. 1.

Implementation of the proposed Technical Specification change will result in the following changes to MTC limits as prescribed in the WBN COLR:

- The 300 ppm surveillance limit would be changed from -31 pcm/°F to -37.5 pcm/°F
- The 60 ppm surveillance limit would be changed from -37.5 pcm/°F to -42.8 pcm/°F
- The EOL MTC limit would be changed from -40 pcm/°F to -45 pcm/°F.

These changes will substantially reduce the chance that repeated surveillance measurements would be required which would perturbate normal reactor operation, while continuing to satisfy plant safety criteria.

III. SAFETY ANALYSIS

The current EOL MTC limit was derived by assuming that the most negative MTC that could occur was at EOL, rated thermal power (RTP), with all control rods fully inserted (ARI) even though Technical Specifications do not allow operation under these conditions. The MTC under these conditions must be less negative than the MTC used in the accident analysis (-55.9 pcm/°F which is equivalent to the moderator density coefficient of 0.43 delta k/k/gm/cc used in the accident analysis). Since a measurement of MTC cannot be made at those conditions, the change in MTC from ARI RTP to all rods out (ARO) RTP was calculated and the limit was set on the ARO RTP MTC.

The new Westinghouse methodology requires the EOL (0 ppm boron) MTC to be more positive than the accident analysis MTC at the conditions of moderator temperature and pressure, rod insertion, axial power shape, and xenon concentration that cause the most negative MTC, at conditions allowable during normal operation. This new methodology ensures that the accident analysis MTC is still bounding for all operating conditions. A conservative adjustment to the accident analysis MTC is applied for each of the conditions that can affect MTC (moderator temperature and pressure, rod insertion, axial power shape, and xenon concentration) to calculate the Technical Specification limit for nominal conditions (ARO equilibrium xenon, design temperature and pressure). Thus when the Technical Specification limit is met, no allowable operating conditions will cause the accident analysis MTC to be exceeded.

The 300 ppm surveillance limit is derived from the EOL limit by conservatively calculating the change expected in MTC between EOL and the 300 ppm surveillance. The proposed new methodology reduces the conservatism in calculating this change by looking at similar cycles and calculating a change that is expected to be bounding. This would reduce that change in MTC between the 300 ppm surveillance limit and the

EOL limit from 9 pcm/°F to 7.5 pcm/°F. The validity of this value is confirmed each cycle as part of the reload design process.

The new methodology is justified and presented in more detail in WCAP-15088, Rev. 1 (proprietary) and WCAP-15089, Rev.1 (non-proprietary), "Safety Evaluation Supporting a More Negative EOL Moderator Temperature Coefficient Technical Specification for the Watts Bar Nuclear Plant", July 1999, Enclosures 4 and 5, respectively.

IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The proposed license amendment would revise the Watts Bar Nuclear Plant (WBN) Unit 1 Technical Specifications (TS) to implement a new methodology supporting a more negative end of life (EOL) Moderator Temperature Coefficient (MTC). TVA has concluded that operation of WBN in accordance with the proposed change to the TS does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c):

A. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

The more negative EOL MTC does not increase the probability of an accident previously evaluated in the FSAR. No new performance requirements are being imposed on any system or component such that any design criteria will be exceeded. The conservative MDC assumption in the current analyses of record has been confirmed to remain bounding for the more negative proposed TS values. Therefore, no change in the modeling of the accident analysis conditions or response is necessary in order to implement this change. The consequences of an accident previously evaluated in the FSAR are not increased due to the more negative EOL MTC. The dose predictions presented in the FSAR remain valid such that no more severe consequences will result.

B. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

The more negative EOL MTC does not create the possibility of an accident which is different than any already evaluated in the FSAR. No new failure modes have been defined for any system or component nor has any new limiting single failure been identified. Conservative assumptions for MDC have already been modeled in the FSAR analyses and it has been determined that the more negative MTC values to be implemented in the TS will continue to be bounded by these assumptions.

C. The proposed amendment does not involve a significant reduction in a margin of safety.

The evaluation of the more negative EOL MTC has taken into account the applicable technical specifications and has bounded the conditions under which the specifications permit operation. The applicable technical specification is Section 5.9.5.b which lists methods approved by the NRC for use in determining the core operating limits. The values of the LCO and SRs are located in the COLR. The analyses which support these technical specifications have been evaluated. The results as presented in the FSAR remain bounding for the more negative EOL MTC. Therefore, the margin of safety, as defined in the bases to these technical specifications, is not reduced.

V. ENVIRONMENTAL IMPACT CONSIDERATION

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. For these reasons, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.