Tennessee Valley Authority
1101 Market Street, LP 3R
Chattanooga, Tennessee 37402-2801

R. M. Krich
Vice President
Nuclear Licensing

May 28, 2010

10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Subject: **Technical Specifications Change WBN-TS-10-05 - Control Rod Assemblies**

In accordance with 10 CFR 50.90, the Tennessee Valley Authority (TVA) requests a Technical Specifications (TS) change, WBN-TS-10-05, for Watts Bar Nuclear Plant, Unit 1, Operating License NPF-90.

The proposed change will revise TS 4.2.2, "Control Rod Assemblies." For TS 4.2.2, the proposed change will include silver-indium-cadmium material in addition to the boron carbide control rod material.

For Watts Bar Unit 1, some of the existing hybrid boron carbide Rod Cluster Control Assemblies have reached the end of life and are required to be replaced. The TS being prepared for Watts Bar Unit 2, currently under construction, is also being revised to reflect this change. The Unit 2 Project plans to submit this TS change and start-up Unit 2 with the silver-indium-cadmium control rod material.

Enclosure 1 to this letter provides the technical evaluation for the proposed TS change including TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review.

Enclosure 2 contains mark-up and retyped version of the appropriate TS page.

Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and attachments to the Tennessee Department of Environment and Conservation.

D030
NRR

TVA requests approval of this TS change by March 1, 2011 to support installation of the control rod assemblies in the Unit 1 Cycle 10 refueling outage. The refueling outage is scheduled to begin March 20, 2011. Implementation of the revised TS will be within 30 days of NRC approval.

There are no commitments associated with this submittal. If you have any questions about this change, please contact Kevin Casey at (423) 751-8523.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 28th day of May, 2010.

Respectfully,

R. M. Krich

Enclosures:

1. TVA Evaluation of Proposed Technical Specifications Change
2. Proposed Technical Specifications Change (Mark-Up)

cc (Enclosures):

NRC Regional Administrator – Region II
NRC Resident Inspector – Watts Bar Nuclear Plant
Director, Division of Radiological Health - Tennessee State Department of Environment and Conservation

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY (TVA)
WATTS BAR NUCLEAR PLANT, UNIT 1
OPERATING LICENSE NPF-90
WBN-TS-10-05

EVALUATION OF PROPOSED CHANGE

1.0 SUMMARY DESCRIPTION

Watts Bar Nuclear Plant (WBN) Unit 1 existing Rod Cluster Control Assemblies (RCCAs) are configured with a hybrid design Boron Carbide (B_4C) absorber material with silver-indium-cadmium (Ag-In-Cd) tips. These RCCAs are being replaced with Enhanced Performance (EP) RCCAs containing only Ag-In-Cd as the absorber material. This RCCA replacement necessitates a change to Technical Specification 4.2.2 (Control Rod Assemblies) to include Ag-In-Cd material in addition to the B_4C control rod material.

In addition to the absorber material change, the replacement EP Ag-In-Cd RCCAs will be coupled with Control Rod Drive Mechanism (CRDM) drive rod shafts which are lighter than the CRDM drive rod shaft coupled to the B_4C drive rod shafts. Also, the EP Ag-In-Cd RCCAs are heavier than the B_4C RCCAs and have a different reactivity, or rod worth.

The changes in weight and reactivity of the CRDM/RCCA on the design criteria and safety analysis as documented in the Updated Final Safety Analysis Report (UFSAR) have been addressed. The following sections provide the technical justification to support a change to Technical Specification 4.2.2 (Control Rod Assemblies) to include Ag-In-Cd material in addition to the B_4C control rod material.

This evaluation is consistent with the evaluations/analyses for the applicable Chapter 3.0 component design, Chapter 4.0 reactor design criteria and the Chapter 15.0 accidents in the UFSAR. Based on the Westinghouse Reload Safety Evaluation Methodology, Reference 1, all of the accidents comprising the licensing bases have been reviewed for the RCCA replacement. The following sections evaluate the impacted areas to demonstrate that the safe operation of the plant will continue with the replacement of the B_4C RCCAs with the EP Ag-In-Cd RCCAs.

2.0 DETAILED DESCRIPTION

Currently, TS 4.2.2 states: "The reactor core shall contain 57 control rod assemblies. The control material shall be boron carbide with silver indium cadmium tips as approved by the NRC."

TS 4.2.2 is revised to state: "The reactor core shall contain 57 control rod assemblies. The control material shall be either silver-indium-cadmium or boron carbide with silver indium cadmium tips as approved by the NRC."

Enclosure 2 contains mark-up and retyped version of the appropriate TS page.

3.0 TECHNICAL EVALUATION

3.1 Mechanical Evaluation

3.1.1 CRDM

The basis for changing from a heavy drive rod to a standard drive rod is twofold. The aging of the current heavy drive rods and the unlatching and latching of the heavy drive rods takes substantially longer than the standard drive rods, using additional critical path time and an associated increase in dose to personnel. In addition, the heavy drive rods were intended to be mated with the lighter B_4C RCCAs. The standard drive rod/Ag-In-Cd RCCA combination was the original design for this component configuration. The subsequent B_4C RCCAs required heavier drive rods to keep the overall driveline weight approximately the same as the standard drive rod/Ag-In-Cd RCCA combination.

As an individual component, the heavy drive rod weighs 170 lbs and the standard drive rod weighs 136 lbs. The 34 lbs lighter difference meets the design criteria for the drive rod. The drive rod weight is specifically used in the missile analysis presented in Section 3.5.1 of the WBN Unit 1 UFSAR. The conclusions of the missile analysis presented in the UFSAR remain applicable for the change to the standard lighter drive rod.

The driveline weight would also be a consideration in the vibration and seismic analysis for the ASME Code CRDM pressure boundary design report. The overall driveline weight increases from 264 lb for heavy CRDM with the B_4C RCCA combination to 285 lb for the standard CRDM with the EP Ag-In-Cd RCCA combination. The Watts Bar 1 design report, however, is based on a generic CRDM design report which is an enveloping design report. Included in the generic design report is consideration of driveline weights up to 320 lb, so the current Watts Bar 1 CRDM design report envelopes the driveline weight change.

The driveline weight also does not affect the drive rod coupling the RCCA hub, which are both designed to accommodate 14 ft core components, which are heavier than the 12 ft core Watts Bar 1 components. The 285 lb driveline weight is enveloped by the 14 ft core weights. Watts Bar 1 will use a modified drive rod coupling, which has a higher fatigue life than the standard coupling.

3.1.2 Ag-In-Cd Control Rods

The switch from the Hybrid B_4C design RCCAs to the EP Ag-In-Cd RCCAs returns Watts Bar to the original design basis of Ag-In-Cd RCCAs. From a mechanical perspective, the EP Ag-In-Cd RCCAs are advantageous for a number of reasons including a relatively high thermal conductivity and reduced swelling concerns as irradiation results in innocuous isotopes, rather than gases. The EP Ag-In-Cd RCCAs utilize three new features that further improve the performance of the RCCAs relative to the existing Hybrid B_4C RCCA design in operation at the Watts Bar plant. These features include high purity rodlet cladding material, an increase in the gap between the absorber tip and the cladding, and industrial hard chrome plating on the surface of the control rodlets which improve margins to applicable wear criteria. Improved control of chemical impurities in the EP-RCCA rodlets enhances rodlet corrosion resistance relative to the existing Hybrid B_4C RCCA design in operation at the Watts Bar plant.

A small increase in the gap between the Ag-In-Cd portion of the absorber and the inside surface of the cladding is incorporated in the EP-RCCAs at the lower end of the rodlet in order to accommodate possible swelling. The increased gap minimizes absorber-to-rodlet interaction and reduces absorber-induced strain of the rodlet. The EP-RCCAs are manufactured with hard chrome electroplated to the rodlet outer surface to provide additional wear resistance relative to the Hybrid B_4C RCCAs. As an individual component, the EP Ag-In-Cd RCCAs weighs 149 lb which is heavier than the Hybrid B4C RCCAs which weigh 94 lb. It has been demonstrated that the residual kinetic energy resulting from the rapid insertion (scram) of the heavier RCCAs is sufficiently absorbed to prevent impact damage to the fuel assemblies. In addition, it has also been demonstrated that the EP Ag-In-Cd RCCAs properly mate with the drive rod couplings within the reactor upper internals assembly so that axial positioning using the CRDMs can be accomplished.

In support of the above mechanical design changes for the EP Ag-In-Cd RCCAs, analyses and evaluations have been performed which demonstrate that all of the mechanical design criteria are satisfied, including wear characteristics, sufficient rod to thimble tube diameter gaps, no surface boiling, maintaining rod centerline temperatures below acceptable limits, as well as ensuring that Condition I and II and III and IV loads meet all applicable stress and fatigue criteria

3.1.3 Rod Drop Time

The combined weight of the CRDM drive rod/RCCA has an impact on the rod drop insertion time. The rod drop time is considered in safety analysis and is also specified in Technical Specification 3.1.5 (Rod Group Alignment Limits). The limit is 2.7 seconds. The overall driveline weight increases from 264 lb for heavy CRDM with the B_4C RCCA combination to 285 lb for the standard CRDM with the EP Ag-In-Cd RCCA combination. The increase in overall weight will result in a shorter rod drop time, thereby meeting the Technical Specification requirement.

3.2 NUCLEAR EVALUATION

For future cycles at WBN Unit 1, the neutron absorbing material present over the full length of the RCCA will be Ag-In-Cd instead of the current B_4C absorbing material. This results in different reactivity insertion characteristics of the replacement EP Ag-In-Cd RCCA as compared to the current hybrid B_4C RCCA.

A review of all nuclear design input parameters used in the safety analyses was performed to identify those parameters that exhibited minimal margin to their limiting condition and were potentially impacted by the replacement EP Ag-In-Cd RCCA. Those parameters which did exhibit both of these characteristics were subject to further evaluation and are discussed in further detail below. No further discussions are provided for those parameters which do exhibit sufficient margin, or are not impacted by the EP Ag-In-Cd RCCA replacement.

The nuclear design models used in these evaluations for the replacement EP Ag-In-Cd RCCAs are consistent with those used in the nuclear design of each reload cycle. The models are based on NRC approved modifications to the PHOENIX-P (Reference 2) and Advanced Nodal Code (ANC, Reference 3) computer codes. These references supplement the standard Westinghouse Reload Safety Evaluation Methodology (Reference 1).

3.2.1 Steamline Break with Coincident Rod Withdrawal at Power

The steamline break (SLB) with coincident rod withdrawal at power (RWAP) is impacted in an adverse manner due to changes in the reactivity insertion characteristics of the replacement EP Ag-In-Cd RCCAs. The nuclear design parameters used in the analyses of the SLB with coincident RWAP have exhibited minimal margin in the reload designs, often requiring reanalysis using cycle-specific values of the nuclear design parameters in order to confirm that all applicable criteria have been met. Nuclear design parameters representing the replacement EP Ag-In-Cd RCCAs were generated for the SLB with coincident RWAP for use in further safety analyses as described in Section 3.4.2. Cycle-specific safety analyses will remain an option for future reload designs utilizing the replacement EP Ag-In-Cd RCCAs.

3.2.2 Shutdown Margin

The shutdown margin (SDM) is impacted in an adverse manner due to changes in the reactivity insertion characteristics of the replacement EP Ag-In-Cd RCCAs. The nuclear design SDM parameter has exhibited minimal margin in the reload designs. Simulations representing the replacement EP Ag-In-Cd RCCA were conducted as part of the evaluation of this nuclear design safety parameter. The evaluation of SDM for the replacement EP Ag-In-Cd RCCA has concluded that this nuclear design parameter will continue to be met (bound by the limiting values assumed in the reference safety analyses) as a result of cycle-specific margins and/or changes in plant operational parameters.

3.2.3 Rod Ejection

The rod ejection event is impacted in an adverse manner due to changes in the reactivity insertion characteristics of the replacement EP Ag-In-Cd RCCAs. The nuclear design parameters used in the rod ejection event have exhibited minimal margin in the reload designs. Simulations representing the replacement EP Ag-In-Cd RCCAs were conducted as part of the evaluation of the related nuclear design safety parameters. The evaluation of the rod ejection event for the replacement EP Ag-In-Cd RCCAs has concluded that this nuclear design parameter will continue to be met as a result of cycle-specific margins and/or changes in plant operational parameters included in the Core Operating limits Report (COLR).

3.2.4 Axial Power Shape Peaking Factors

The behavior of axial power shapes used in the confirmation of other safety parameters are potentially impacted in an adverse manner due to changes in the reactivity insertion characteristics of the replacement EP Ag-In-Cd RCCAs. The axial power shapes have occasionally exhibited minimal margin in the reload designs. Simulations representing the replacement EP Ag-In-Cd RCCAs were conducted as part of the evaluation of the related axial power shape parameters. The evaluation of the axial power shape behavior for the replacement EP Ag-In-Cd RCCAs has concluded that this nuclear design parameter will continue to be met as a result of cycle-specific margins and/or changes in plant operational parameters included in the COLR.

3.3 THERMAL AND HYDRAULIC (T/H) EVALUATION

The DNB analyses of the RFA-2 fuel are based on the NRC approved Revised Thermal Design Procedure (RTDP) described in Reference 4. The RFA-2 fuel DNB analyses use the NRC approved WRB-2M DNB correlation (Reference 5) with the adjustment factor specified in Reference 6. The Westinghouse version of the VIPRE-01 subchannel code (Reference 7) was applied for the safety analyses based on the NRC-approved methodology described in Reference 8.

The change from the B_4C RCCA design to EP Ag-In-Cd RCCA design has no direct impact on the DNB evaluation for Watts Bar Unit 1. However, the neutronic impact of the RCCA change on the core transient response did require the reanalysis of the steamline break coincident with rod withdrawal at power event. The DNB design criterion was met for the revised transient response.

A core component cooling evaluation was done for the EP Ag-In-Cd RCCA design. The core component boiling criteria for the core component cooling evaluation are met for the heating rates associated with the EP Ag-In-Cd RCCA design. Therefore, the EP Ag-In-Cd RCCA design meets the thermal hydraulic design criteria for core components.

3.4 SAFETY ANALYSES

3.4.1 Loss of Coolant Accidents

Small Break Loss of Coolant Accident

The current licensing basis Small Break Loss of Coolant Accident (SBLOCA) analysis for Watts Bar Unit 1 uses the 10 CFR Part 50, Appendix K methodology. The Appendix K SBLOCA analysis would be impacted by changes to the RCCA rod drop time and/or RCCA geometry. The replacement of B4C RCCAs with Heavy CRDMs with EP Ag-In-Cd RCCAs with standard (lighter) CRDM drive rod shafts does not change the specific RCCA geometry modeled in the current SBLOCA. In addition, the RCCA rod drop time is within the Technical Specification limits of 2.7 seconds. Therefore, it can be concluded that the CRDM and RCCA change is bounded by the SBLOCA analysis of record.

Best Estimate Loss of Coolant Accident

The current Best Estimate Loss of Coolant Accident (BELOCA), Reference 9, does not credit or model control rod insertion. The changes in the CRDM and RCCA material will not impact the BELOCA licensing basis.

3.4.2 Non-Loss of Coolant Accidents

A review of the existing non-LOCA safety analyses for Watts Bar Unit 1, which are based on the use of B_4C RCCAs, has determined that the current analyses remain valid for use with EP Ag-In-Cd RCCAs. Consistent with the Westinghouse Reload Safety Evaluation Methodology Reference 1, cycle-specific confirmation of key reload related parameters, including those impacted by the RCCA replacement, must be performed prior to each reload. As described in Section 3.2, it has been concluded that the relevant nuclear design parameters will continue to be met as a result of cycle-specific margins and/or changes in plant operational parameters included in the COLR.

With respect to the steamline break coincident with rod withdrawal at power event, the transient response to various sets of nuclear design parameters related to the RCCAs were developed to reduce the likelihood that the event will have to be reanalyzed due to cycle-to-cycle variations. It has been concluded that there is sufficient margin to the acceptance criteria to accommodate any expected changes as a result of reload related changes. Note that the steamline break coincident with rod withdrawal at power event is performed in support of Watts Bar Unit 1 reload analysis but not presented in the UFSAR.

3.5 SUMMARY AND CONCLUSIONS

The change to Technical Specification 4.2.2 (Control Rod Assemblies) to allow Ag-In-Cd material in addition to the B_4C control rod material has been evaluated with respect to the UFSAR areas impacted by the change. The differences between the B_4C and EP Ag-In-Cd RCCA weight and reactivity have been addressed. The EP Ag-In-Cd RCCA/standard drive line weight continues to meet the rod drop time of 2.7 seconds limit listed in Technical Specification 3.1.5 (Rod Group Alignment Limits). The reactivity difference was addressed for the impact on core neutronics and safety analyses. It was determined that the reactivity change can be accommodated within the bounds of the current safety analysis limits using NRC approved methodologies. Future core designs will use the NRC approved methodologies (Reference 1) as the means to demonstrate the continued safe operation of the plant with the EP Ag-In-Cd RCCAs.

4.0 REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

The 10 CFR 50, Appendix A, General Design Criteria (GDC) for nuclear power plants have been assessed to assure that the replacement EP Ag-In-Cd RCCAs will satisfy regulatory design requirements. The criteria associated with the RCCAs are listed below along with a discussion of how the criteria will continue to be met.

Criterion 10 - Reactor design - The principal difference, which has some impact on reactor design, is the difference in weight with regard to the EP Ag-In-Cd RCCAs. The EP Ag-In-Cd RCCA/standard drive line weight continues to meet the rod drop time of 2.7 seconds limit listed in Technical Specification 3.1.5 (Rod Group Alignment Limits).

The change in absorber material from B_4C to Ag-In-Cd also affects this criterion. The reactivity difference was addressed for the impact on core neutronics and safety analyses. It was determined that the reactivity change can be accommodated within the bounds of the current safety analysis limits using approved NRC methodology. Future core designs will use an NRC approved methodology as the means to demonstrate the continued safe operation of the plant with the EP Ag-In-Cd RCCAs.

Criterion 12 - Suppression of reactor power oscillations - Axial power oscillations are controlled using the RCCAs. The EP Ag-In-Cd RCCAs can be effectively used to control reactivity oscillations. The ability to reliably detect and suppress power oscillations is unaffected by the proposed changes.

Criterion 13 - Instrumentation and control - The existing systems and components used for monitoring and control of RCCA positions are unaffected by the proposed changes and will be equally effective and relied upon for the control of the EP Ag-In-Cd RCCAs.

Criterion 26 - Reactivity control system redundancy and capability - Redundancy and capability for the RCCAs to control reactivity is not impacted and remains bounded by maintaining the operational restrictions. The reactivity difference was addressed for the impact on core neutronics and safety analyses. It was determined that the reactivity change can be accommodated within the bounds of the current safety analysis limits using approved NRC methodology. Future core designs will use an NRC approved methodology as the means to demonstrate the continued safe operation of the plant with the EP Ag-In-Cd RCCAs.

Criterion 27 - Combined reactivity control systems capability - The current design of the Reactor Control Systems include a more than adequate capability for reactivity control using only the EP Ag-In-Cd RCCAs. The design of the replacement EP Ag-In-Cd RCCAs meet all the same performance requirements of the current design and will not introduce any new effect which could adversely impact the performance of the RCCAs. Therefore, the reactivity control systems remain capable of reliably controlling reactivity changes to assure that under postulated accident conditions and with appropriate margin for stuck rods, the capability to cool the core is maintained.

Criterion 28 - Reactivity limits - The ability of the EP Ag-In-Cd RCCAs to control reactivity is not impacted and remains bounded by maintaining the operational restrictions assumed in the reload analysis and shown to be acceptable by the reload process. The reactivity difference was addressed for the impact on core neutronics and safety analyses. It was determined that the reactivity change can be accommodated within the bounds of the current safety analysis limits using approved NRC methodology. Future core designs will use an NRC approved methodology as the means to demonstrate the continued safe operation of the plant with the EP Ag-In-Cd RCCAs.

Criterion 29 - Protection against anticipated operational occurrences - The replacement EP Ag-In-Cd RCCAs have been evaluated against design criteria applicable to the existing RCCAs, and it was determined that they will function as required during anticipated operating occurrences (AOO). The Ag-In-Cd RCCA/standard drive line weight continues to meet the rod drop time of 2.7 seconds limit listed in Technical Specification 3.1.5 (Rod Group Alignment Limits). The reactivity difference was addressed for the impact on core neutronics and safety analyses. It was determined that the reactivity change can be accommodated within the bounds of the current safety analysis limits using approved NRC methodology. Future core designs will use an NRC approved methodology as the means to demonstrate the continued safe operation of the plant with the EP Ag-In-Cd RCCAs.

4.2 Significant Hazard Consideration

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. **Does the proposed amendment involve a significant increase in the probability or consequence of an accident previously evaluated?**

   Response: No.

   Watts Bar Unit 1 Technical Specification 4.2.2, Control Rod Assemblies, is revised to include Ag-In-Cd material in addition to the B_4C control rod material. In addition to the absorber material change, the replacement EP Ag-In-Cd RCCAs will be coupled with Control Rod Drive Mechanism (CRDM) drive rod shafts which are lighter than the CRDM drive rod shaft coupled to the B_4C drive rod shafts. Also, the EP Ag-In-Cd RCCAs are heavier than the B_4C RCCAs and have a different reactivity, or rod worth.

There are a number of events that are related to inadvertent movement of the RCCAs; however, they are not initiated by the RCCAs. They are initiated by the failure of plant structures, systems, or components (SSC) other than the RCCAs. The proposed changes to the RCCA design do not have a detrimental impact on the integrity of any plant SSC that initiates an analyzed event. In addition, the EP Ag-In-Cd RCCAs have the capability to mitigate events, because:

a) The Ag-In-Cd RCCA/standard drive line weight continues to meet the rod drop time of 2.7 seconds limit listed in Technical Specification 3.1.5 (Rod Group Alignment Limits); and

b) The reactivity difference was addressed for the impact on core neutronics and safety analyses. It was determined that the reactivity change can be accommodated within the bounds of the current safety analysis limits using approved NRC methodology. Future core designs will use an NRC approved methodology as the means to demonstrate the continued safe operation of the plant with the EP Ag-In-Cd RCCAs.

The change does not adversely affect the protective and mitigative capabilities of the plant, nor does the change affect the initiation or probability of occurrence of any accident. The SSCs will continue to perform their intented safety functions. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

Watts Bar Unit 1 Technical Specification 4.2.2, Control Rod Assemblies, is revised to include Ag-In-Cd material in addition to the B_4C control rod material. In addition to the absorber material change, the replacement EP Ag-In-Cd RCCAs will be coupled with Control Rod Drive Mechanism (CRDM) drive rod shafts which are lighter than the CRDM drive rod shaft coupled to the B_4C drive rod shafts. Also, the EP Ag-In-Cd RCCAs are heavier than the B_4C RCCAs and have a different reactivity, or rod worth.

The EP Ag-In-Cd RCCAs are identical to the current RCCAs in terms of form, fit, and function. The proposed changes will not introduce any new failure mechanisms, malfunctions, or accident initiators not already considered in the design and licensing basis. The possibility of a new or different malfunction of safety-related equipment is not created. No new accident scenarios, transient precursors, or limiting single failures are introduced as a result of these changes. There will be no adverse effects or challenges imposed on any safety-related system as a result of these changes. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. **Does the proposed amendment involve a significant reduction in a margin of safety?**

Response: No.

Watts Bar Unit 1 Technical Specification 4.2.2, Control Rod Assemblies, is revised to include Ag-In-Cd material in addition to the B_4C control rod material. In addition to the absorber material change, the replacement EP Ag-In-Cd RCCAs will be coupled with Control Rod Drive Mechanism (CRDM) drive rod shafts which are lighter than the CRDM drive rod shaft coupled to the B_4C drive rod shafts. Also, the EP Ag-In-Cd RCCAs are heavier than the B_4C RCCAs and have a different reactivity, or rod worth. The changes in weight and reactivity of the CRDM/RCCA on the design criteria and safety analysis have been addressed.

The proposed changes regarding the Ag-In-Cd RCCAs do not involve a significant reduction in a margin of safety, because:

a) The Ag-In-Cd RCCA/standard drive line weight continues to meet the rod drop time of 2.7 seconds limit listed in Technical Specification 3.1.5 (Rod Group Alignment Limits); and

b) The reactivity difference was addressed for the impact on core neutronics and safety analyses. It was determined that the reactivity change can be accommodated within the bounds of the current safety analysis limits using approved NRC methodology. Future core designs will use an NRC approved methodology as the means to demonstrate the continued safe operation of the plant with the EP Ag-In-Cd RCCAs.

Therefore, the proposed change does not involve a significant reduction in the margin of safety.

Based on the above, TVA concludes that the proposed changes to the WBN Unit 1 TS do not involve a significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

4.3 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

1. Davidson, S. L., (Ed.), et al., "Westinghouse Reload Safety Evaluation Methodology," WCAP-9273-NP-A, July 1985.
2. Nguyen, T. Q., et al., "Qualification of the PHOENIX-P/ANC Nuclear Design System for Pressurized Water Reactor Cores," WCAP-11596-P-A, June 1988.
3. Liu, Y. S., et al., "ANC: A Westinghouse Advanced Nodal Computer Code," WCAP 10965-P-A, September 1986.
4. Friedland, A. J., and Ray, S., "Revised Thermal Design Procedure," WCAP-11397-P-A, April 1989.
5. Smith, L. D., et al., "Modified WRB-2 Correlation, WRB-2M, for Predicting Critical Heat Flux in 17x17 Bundles with Modified LPD Mixing Vane Grids," WCAP-15025-P-A, April 1999.
6. Stewart, C. W., et al., "VIPRE-01: A Thermal-Hydraulic Code for Reactor Cores," Volume 1-3 (Revision 3, August 1989), Volume 4 (April 1987), NP-2511-CCM-A, Electric Power Research Institute.
7. Sung, Y., et al., "VIPRE-01 Modeling and Qualification for Pressurized Water Reactor Non-LOCA Thermal-Hydraulic Safety Analysis," WCAP-14565-P-A/15306-NP-A, October 1999.
8. Letter from D.S. Collins (NRC) to J.A. Gresham (Westinghouse), "Modified WRB-2 Correlation WRB- 2M for Predicting Critical Heat Flux in 17 x 17 Rod Bundles with Modified LPD Mixing Vane grids," February 3, 2006.
9. "Code Qualification Document for Best-Estimate Loss of Coolant Analysis," Volume 1 (Revision 2) and Volumes 2 through 5 (Revision 1), WCAP-12945-P-A, March 1998

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY (TVA)
WATTS BAR NUCLEAR PLANT, UNIT 1
OPERATING LICENSE NPF-90
WBN-TS-10-05

PROPOSED TECHNICAL SPECFICATION CHANGES

I. AFFECTED PAGE LIST

TS Page 4.0-1

II. MARKED PAGES

See attached.

Note: Additions are shown in bold italics.

III. RETYPED PAGES

See attached.

4.0 DESIGN FEATURES

4.1 Site

4.1.1 Site and Exclusion Area Boundaries

The site and exclusion area boundaries shall be as shown in Figure 4.1-1.

4.1.2 Low Population Zone (LPZ)

The LPZ shall be as shown in Figure 4.1-2 (within the 3-mile circle).

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 193 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy or Zirlo fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions. For Unit 1, Watts Bar is authorized to place a maximum of 704 Tritium Producing Burnable Absorber Rods into the reactor in an operating cycle.

4.2.2 Control Rod Assemblies

The reactor core shall contain 57 control rod assemblies. The control material shall be ***either silver-indium-cadmium or*** boron carbide with silver indium cadmium tips as approved by the NRC.

(continued)

4.0 DESIGN FEATURES

4.1 Site

4.1.1 Site and Exclusion Area Boundaries

The site and exclusion area boundaries shall be as shown in Figure 4.1-1.

4.1.2 Low Population Zone (LPZ)

The LPZ shall be as shown in Figure 4.1-2 (within the 3-mile circle).

4.2 Reactor Core

4.2.1 Fuel Assemblies

The reactor shall contain 193 fuel assemblies. Each assembly shall consist of a matrix of Zircalloy or Zirlo fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO_2) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions. For Unit 1, Watts Bar is authorized to place a maximum of 704 Tritium Producing Burnable Absorber Rods into the reactor in an operating cycle.

4.2.2 Control Rod Assemblies

The reactor core shall contain 57 control rod assemblies. The control material shall be either silver-indium-cadmium or boron carbide with silver indium cadmium tips as approved by the NRC.

(continued)