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APR 20 1993

U.S. Nuclear Regulatory Commission
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Gentlemen:

In the Matter of the Application of )
Tennessee Valley Authority )

Docket No. 50-390

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION ON THE DRAFT TECHNICAL SPECIFICATIONS

By letter dated March 15, 1993, the staff asked for additional information on the disposition of eight Safety Evaluation Report (SER) issues relative to the WBN Technical Specifications. TVA is responding to five of these questions in the enclosure to this letter. TVA is continuing to review the remaining three SER related questions and will provide a proposed disposition with respect to the Technical Specifications by May 28, 1993.

If you have any questions, please telephone Tom Porter at (615) 365-3854.

Very truly yours,

W. J. Museler

William J. Museler

Enclosure
cc: See page 2

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cc (Enclosure):

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ENCLOSURE

NRC Question 1:

Safety Evaluation Report (SER) Section 4.2.1 states the following: "All fuel rods will be internally prepressurized with helium.... The special level of prepressurization will depend on the planned fuel burn up and will be determined before the Technical Specifications are established." The implication of the SER statement is that the fuel prepressurization is a design characteristic for the Watts Bar fuel assemblies and should be specified in Section 4.0, "Design Features" of the Watts Bar TS. The marked-up version of Rev. 0 of the Revised Standard Technical Specifications (RSTS) Section 4.2.1 "Fuel Assemblies," submitted on August 27, 1992, does not reflect the SER statement. Revise Section 4.2.1 to incorporate this design feature.

RESPONSE:

The issue here appears to address the impact on Technical Specifications (TS) that an unknown "initial backfill pressure" would have. The initial backfill pressure is determined during the fuel rod design and is sized to, among other things, preclude the occurrence of clad flattening (with resultant power spikes). The fuel rods are designed for extended burnup operation using the NRC approved Westinghouse burnup design methods, models and criteria given in References 1, 2 and 3. The detailed fuel rod design establishes such parameters as pellet size and density, clad-pellet diametral gap, gas plenum size and helium pre-pressure. The design also considers effects such as fuel density changes, fission gas release, clad creep, and other physical properties which vary with burnup. SER Supplement 2, Section 4.2.2 indicates that the Staff has reviewed the Westinghouse Topical Reports, including the internal fuel rod pressurization criteria, and found them acceptable. The SER supplement also concluded that the issue was closed. In addition, this is standard vendor practice and this information was not determined to be key design information that needed to be included in the Improved Standard Technical Specification.

NRC QUESTION 2:

SER Section 4.2.3 states the following: "Although the staff concludes that fuel rod bowing calculations will be performed in an acceptable manner, final resolution of this issue will require that the applicant (1) identify in the basis of the Technical Specifications any plant specific or generic margin (credits) used to offset the reduction in DNBR due to fuel rod bowing and (2) incorporate the residual rod bowing penalty into the Technical Specifications." SER Section 4.4.4.1 provides additional information which could be incorporated into the TS to address this concern. The August 27, 1992, marked-up RSTS does not seem to address this. Either show that the requirement has been incorporated into the August 27, 1992, marked-up RSTS or propose appropriate TS and/or Bases.

RESPONSE to Item 2 (1):

Fuel rod bowing was addressed in Section 4.4.2.3.5, "Effects of Rod Bow on DNBR" in TVA letter dated August 24, 1992, which provided proposed WBN FSAR changes to address the VANTAGE 5H fuel recaging modifications. The proposed changes stated:

> "For the safety analysis of the Watts Bar Units, sufficient DNBR margin was maintained (see Section 4.4.1.1) to accommodate the full and low flow rod bow penalties identified in Reference 89. The reference penalties are applicable to VANTAGE 5H fuel assembly analyses using the WRB-1 DNB correlation."

> "The maximum rod bow penalties (< 1.5% DNBR) accounted for in the design safety analysis are based on an assembly average burnup of 24,000 MWD/MTU. At burnups greater than 24,000 MWD/MTU, credit is taken for the effect of $F^N_{\Delta H}$ burndown, due to the decrease in fissionable isotopes and the buildup of fission product inventory, and no additional rod bow penalty is required, Reference [95]."

In the same letter, proposed changes to FSAR Section 4.4.1.1 states the following:

> "Historically, the DNBR limit has been 1.30 for Westinghouse applications. In this application, the WRB-1 correlation (Reference 91) is employed. With the significant improvement in the accuracy of the critical heat flux prediction by using the WRB-1 correlation instead of previous DNB correlations, a DNBR limit of 1.17 is applicable for the VANTAGE 5H fuel assembly (Reference 92)."

> "DNBR margin is maintained for the VANTAGE 5H fuel by performing the DNB safety analysis which uses the WRB-1 correlation to a DNBR limit of 1.31. Comparing this safety analysis limit of 1.31 to the WRB-1 correlation limit of 1.17 results in 10.7% DNBR margin."

Table 4.1 of the initial WBN SER no longer applies per the above paragraph and should be replaced with a new SER discussion after the FSAR amendment is submitted. The 10.7% DNBR margin is more than sufficient to cover the maximum rod bow penalty of 1.5%. TVA plans to incorporate the above changes formally in a future FSAR amendment after receiving NRC concurrence.

RESPONSE to Item 2 (2):

The reactor core safety limits will reflect use of the WRB-1 DNB correlation limit of 1.17 and a safety analysis limit of 1.31. TVA will propose that the Bases for the Safety Limits be revised to reflect the fact that all rod bow penalties are accounted for in the 10.7% safety margin to the WRB-1 correlation limit of 1.17. The proposed revision will be included in our comments to the Proof and Review Technical Specifications.

NRC QUESTION 3:

SER Section 4.4.4.2, requires that appropriate surveillance requirements be included in Technical Specifications to recognize any rapid crud buildup in the reactor core. Provide appropriate surveillance requirements.

RESPONSE:

Section 4.4.4.2, "Crud Deposition," of the initial WBN SER (1982) discusses concerns with crud deposition in non-Westinghouse PWR's sufficient enough to result in core pressure drop and flow changes. In response to a staff question, Westinghouse provided information detailing how Westinghouse accounts for possible crud buildup in the generation of safety limits, and identified means of tracking core operating parameters that might indicate, among other things, a rapid crud buildup.

In the subject statement above, mention is made of including in the plant Technical Specifications "appropriate surveillance requirements to recognize rapid crud buildup." Note that there has never been a TS surveillance requirement for any Westinghouse designed plant that would indicate specific conditions related to flow reductions, power reductions or temperature excursions that would rule out all possible operating anomalies with the exception of crud buildup. However, generically, TS for operating Westinghouse PWR's include a surveillance requirement in the TS which limit core parameters important to safety analysis DNB limits.

For the current Proof and Review WBN TS, Surveillance Requirement 3.2.2.1 of LCO 3.2.2, "Nuclear Enthalpy Rise Hot Channel Factor ($F^N_{\Delta H}$)," requires that $F^N_{\Delta H}$ is a measure of the maximum total power produced in a fuel rod. The Core Operating Limits Report (COLR) provides limits that ensure that the design basis value of the departure from nucleate boiling (DNB) is met for normal operation, operational transients, and transient conditions arising from events of moderate frequency.

During power operation, the global power distribution is monitored by LCO 3.2.3, "Axial Flux Difference (AFD)," and LCO 3.2.4, "Quadrant Power Tilt Ratio (QPTR)," which address directly and continuously measured process variables.

In conclusion, TVA believes that the NRC's SER statement requiring a TS surveillance requirement to monitor crud buildup is addressed through the surveillances of core operating parameters in LCO 3.2.2 and is monitored by LCO 3.2.3 and LCO 3.2.4.

NRC QUESTION 6:

SER Section 9.5.4 describes the various means of filling the Diesel Generator (DG) fuel oil storage tank. One of these ways involved routing a hose from the delivery vehicle to the DG tank manway openings located in the DG building hallway area. The SER states that this DG tank filling method is acceptable provided that fire watches are stationed in these areas during the tank filling period and that the provision is included in the TS. Since the issuance of the SER, the staff has issued Generic Letter 88-12 which provides guidance to relocate fire protection requirements. Please either provide appropriate TS and Bases, or justification for relocation to the TRM.

RESPONSE:

TVA considers a specific statement in the Technical Specifications or equivalent document for a fire watch when refilling the DGs via the manways to the 7-day storage tanks to be unnecessary. There are other methods for refilling the DGs should a missile disable the fuel oil storage tanks in the yard and DG fill lines located outside of the buildings. The method described in the SER involves removal of the 24-inch manway covers leading to the storage tanks and is considered to be the least desirable method. Other alternate methods are described below:

1. The best method for refilling the 7-day storage tanks is by use of the fuel oil storage fill ports in the pipe gallery and corridor room (hallway). This hallway is separated from the engine rooms and their associated equipment by a 3-hour fire rated barrier. The hallway is protected by a sprinkler system and the engine rooms are protected by total flooding $CO_2$ systems.

2. The next best method for refilling the 7-day storage tanks is by use of the fuel oil sample ports in the manway covers. These manway covers are located in the hallway.

3. The least desirable method is opening of the manway covers in the hallway. Alternatively, the manway in each engine room could be used. The engine rooms are separated from each other by 3-hour fire barriers, a total flooding $CO_2$ system in each room, and the sprinkler system in the hallway.

Regardless of the alternate refilling method, the fire protection systems in the DG buildings are designed to protect against a fuel oil fire. Should the fire protection features, both active and passive, be made inoperable, then appropriate compensatory measures would be established in accordance with TRM and/or Fire Protection Report requirements on the fire detection, $CO_2$, sprinkler, and fire barrier systems. It should also be noted that procedural controls require that an hourly fire watch be established any time a fire door is breached which would occur when routing a hose to the refill location in the DG buildings. Based on these considerations, TVA believes that no additional requirements are necessary and the SER should be clarified accordingly.

NRC QUESTION 8:

In SSER 5, Section 15.3.6 the staff found TVA's response to GL 83-28 with regards to items 3.1.3 and 3.2.3 on post-maintenance testing of the reactor trip breakers in TS to be acceptable. Provide appropriate surveillance requirements for these tests.

RESPONSE:

TVA has reviewed the referenced SSER section and can find no commitment or requirement to provide any additional surveillance requirements for reactor trip breakers beyond those already included in the Technical Specifications. NRC's letter to H. G. Parris, December 10, 1985, found TVA's response to these items to be acceptable, but requested that TVA review the Technical Specifications for any requirements that could degrade, rather than enhance safety. TVA provided a letter dated January 17, 1986, which stated that no Technical Specifications were identified that would degrade rather than enhance safety. As a result, TVA concluded that the existing technical specifications were complete and correct with regard to reactor trip breaker testing. This is discussed and accepted in the staff letter dated July 2, 1990, which is referenced in the SSER.

References:

1. Miller, J. V., (Ed), "Improved Analytical Models used in Westinghouse Fuel Rod Design Computations," WCAP-8720 (Proprietary) and WCAP-8785 (Non-Proprietary), October, 1976.

2. Weiner, R. A., et al, "Improved Fuel Performance Models for Westinghouse Fuel Rod Designs and Safety Evaluations," WCAP-10851-P-A (Proprietary) and WCAP-11873-NP-A (Non-Proprietary), August, 1988.

3. Davidson, S. L. (Ed) et al, "Extended Burnup Evaluation of Westinghouse Fuel," WCAP-10125-P-A (Proprietary) and WCAP-10126-NP-A (Non-Proprietary), December, 1985.

89. "Partial Response to Request Number 1 for Additional Information on WCAP-8691, Revision 1," Letter, E. P. Rahe, Jr., (Westinghouse) to J. R. Miller (NRC), NS-EPR-2515, dated October 9, 1981; "Remaining Response to Request Number 1 for Additional Information on WCAP-8691, Revision 1," Letter, E. P. Rahe, Jr., (Westinghouse) to J. R. Miller (NRC), NS-EPR-2572, dated March 16, 1982.

91. F. E. Motley, K. W. Hill, F. F. Cadek, and J. Shefcheck, "New Westinghouse Correlation WRB-1 for Predicting Critical Heat Flux in Rod Bundles with Mixing Vane Grids," WCAP-8762-P-A, July 1984.

92. Davidson, S. L., (Ed), et al, "VANTAGE 5H Fuel Assembly," WCAP-10444-P-A, Addendum 2A, October, 1982.

95. Letter from C. Berlinger (NRC) to E. P. Rahe, Jr. (W), Subject: "Request for Reduction in Fuel Assembly Burnup Limit for Calculation of Maximum Rod Bow Penalty," June 18, 1986.