August 10, 1998

Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

SUBJECT: ISSUANCE OF AMENDMENT RELOCATING F(Q) PENALTY TO COLR (TAC NO. MA1728)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. 11 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant (WBN), Unit 1. This amendment is in response to your application dated May 6, 1998.

The requested changes would replace the two percent penalty addressed in Surveillance Requirement 3.2.1.2(a) with a burnup-dependent factor to be specified in the WBN Core Operating Limits Report (COLR) and makes associated changes to the administrative controls in Technical Specification 5.9.5 and the BASES. The Nuclear Regulatory Commission staff found the application to be well prepared, particularly the historical background regarding the need for relocation of the subject penalty factor to the COLR.

A copy of the safety evaluation is also enclosed. Notice of issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by L. Raghavan for:
Robert E. Martin, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosures: 1. Amendment No. 11 to NPF-90
2. Safety Evaluation

cc w/enclosures: See next page

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

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L Raghavan

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Docket No. 50-390

Enclosures: 1. Amendment No. 11 to NPF-90
2. Safety Evaluation

Mr. J. A. Scalice
Tennessee Valley Authority

WATTS BAR NUCLEAR PLANT

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

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-390

WATTS BAR NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 11
License No. NPF-90

1. The Nuclear Regulator Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated May 6, 1998, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-90 is hereby amended to read as follows:

(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 11 , and the Environmental Protection Plan contained in Appendix B, both of which are attached hereto, are hereby incorporated into this license. TVA shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance, to be implemented no later than 30 days of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Frederick J. Hebdon, Director
Project Directorate II-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: August 10, 1998

ATTACHMENT TO AMENDMENT NO. 11

FACILITY OPERATING LICENSE NO. NPF-90

DOCKET NO. 50-390

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the enclosed pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

Remove Pages	Insert Pages
3.2-4	3.2-4
5.0-32	5.0-32
B3.2-9	B3.2-9

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.2.1.2	----------NOTE---------- If F^W_Q (Z) is within limits and measurements indicate $$\text{maximum over } z \left[\frac{F^C_Q(Z)}{K(Z)} \right]$$ has increased since the previous evaluation of F^C_Q (Z): a. Increase F^W_Q (Z) by the appropriate factor specified in the COLR and reverify F^W_Q (Z) is within limits; or b. Repeat SR 3.2.1.2 once per 7 EFPD until two successive flux maps indicate $$\text{maximum over } z \left[\frac{F^C_Q(Z)}{K(Z)} \right]$$ has not increased. ----------	
	Verify F^W_Q (Z) is within limit.	Once after initial fuel loading and each refueling prior to THERMAL POWER exceeding 75% RTP AND (continued)

5.9 Reporting Requirements (continued)

5.9.5 CORE OPERATING LIMITS REPORT (COLR)

a. Core operating limits shall be established prior to the initial and each reload cycle, or prior to any remaining portion of a cycle, and shall be documented in the COLR for the following:

LCO 3.1.4 Moderator Temperature Coefficient
LCO 3.1.6 Shutdown Bank Insertion Limit
LCO 3.1.7 Control Bank Insertion Limits
LCO 3.2.1 Heat Flux Hot Channel Factor
LCO 3.2.2 Nuclear Enthalpy Rise Hot Channel Factor
LCO 3.2.3 Axial Flux Difference
LCO 3.9.1 Boron Concentration

b. The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. WCAP-9272-P-A, WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY", July 1985 (W Proprietary). (Methodology for Specifications 3.1.4 - Moderator Temperature Coefficient, 3.1.6 - Shutdown Bank Insertion Limit, 3.1.7 - Control Bank Insertion Limits, 3.2.1 - Heat Flux Hot Channel Factor, 3.2.2 - Nuclear Enthalphy Rise Hot Channel Factor, 3.2.3 - Axial Flux Difference, and 3.9.1 - Boron Concentration.

2. WCAP-10266-P-A Rev. 2, "THE 1981 VERSION OF WESTINGHOUSE EVALUATION MODEL USING BASH CODE", March 1987, (W Proprietary). (Methodology for Specification 3.2.1 - Heat Flux Hot Channel Factor).

3. WCAP-10216-P-A, Revision 1A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL F(Q) SURVEILLANCE TECHNICAL SPECIFICATION," February 1994 (W Proprietary).(Methodology for Specifications 3.2.1 - Heat Flux Hot Channel Factor (W(Z) Surveillance Requirements For F(Q) Methodology) and 3.2.3 - Axial Flux Difference (Relaxed Axial Offset Control).)

4. WCAP-12610-P-A, "VANTAGE + FUEL ASSEMBLY REFERENCE CORE REPORT," April 1995. (W Proprietary). (Methodology for Specification 3.2.1 - Heat Flux Hot Channel Factor).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.2.1.2 (continued)

If the two most recent F_Q (Z) evaluations show an increase in the expression

$$\text{maximum over } z \left[\frac{F_Q^C(Z)}{K(Z)} \right],$$

it is required to meet the F_Q (Z) limit with the last F^W_Q (Z) increased by the appropriate factor specified in the COLR, or to evaluate F_Q (Z) more frequently, each 7 EFPD. These alternative requirements prevent F_Q (Z) from exceeding its limit for any significant period of time without detection.

Performing the Surveillance in MODE 1 prior to exceeding 75% RTP ensures that the F_Q (Z) limit is met when RTP is achieved, because peaking factors are generally decreased as power level is increased.

F_Q (Z) is verified at power levels $\geq$ 10% RTP above the THERMAL POWER of its last verification, 12 hours after achieving equilibrium conditions to ensure that F_Q (Z) is within its limit at higher power levels.

The Surveillance Frequency of 31 EFPD is adequate to monitor the change of power distribution with core burnup. The Surveillance may be done more frequently if required by the results of F_Q (Z) evaluations.

The Frequency of 31 EFPD is adequate to monitor the change of power distribution because such a change is sufficiently slow, when the plant is operated in accordance with the TS, to preclude adverse peaking factors between 31 day surveillances.

REFERENCES

1. Title 10, Code of Federal Regulations, Part 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Nuclear Power Reactors."

2. Regulatory Guide 1.77, Rev. 0, "Assumptions Used for Evaluating a Control Rod Ejection Accident for Pressurized water Reactors," May 1974.

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 11 TO FACILITY OPERATING LICENSE NO. NPF-90

TENNESSEE VALLEY AUTHORITY

WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-390

1.0 INTRODUCTION

By letter dated May 6, 1998, the Tennessee Valley Authority (TVA or the licensee) submitted a request for changes to the Watts Bar Nuclear Plant, Unit 1, (WBN) Technical Specifications (TS). The requested changes would replace the two percent penalty addressed in surveillance requirement (SR) 3.2.1.2(a) with a burnup-dependent factor to be specified in the WBN Core Operating Limits Report (COLR). Specifically, the following changes are made:

1. SR 3.2.1.2(a) and its associated BASES will have the phrase "by a factor of 1.02" deleted and replaced with the phrase "by the appropriate factor specified in the COLR."

2. TS 5.9.5(b)(3) is changed to include the updated WCAP 10216-P-A, Revison 1A, February 1994, which details the analytical methods utilized for the new penalty factor.

The administrative reporting requirement in TS 5.9.5 establishes core operating limits that are to be documented in the COLR before each reload cycle or any part of a reload cycle. The COLR is defined in the Definitions section of the TS as the unit-specific document that provides these limits for the current operating cycle.

2.0 EVALUATION

Specific guidance for the proposed amendment is provided in Generic Letter (GL) 88-16, "Removal of Cycle-Specific Parameter Limits from Technical Specifications," dated October 4, 1988. In this letter, the NRC staff concluded that the condition must be retained in the TS requiring that the plant be operated within the bounds of cycle-specific parameter limits shown by analysis to result in safe operation. However, the specific values of these limits may be modified by licensees without affecting nuclear safety, provided that these changes are determined using an NRC-approved methodology and are consistent with all limits of the plant safety analysis that are addressed in the WBN Final Safety Analysis Report.

ENCLOSURE

TVA indicates that the burnup-dependent heat flux hot channel factor, $F_Q^W(Z)$, current penalty value of two percent was based on the Westinghouse (W) assumption that the peak steady-state heat flux hot channel factor, $F_Q^C(Z)$, would not change more than two percent between monthly reactor core flux maps. This assumption was based on previous core designs that predate the low leakage loading patterns, 18-month fuel cycles, higher amounts of burnable poisons, and use of integral fuel burnable absorber, that have been more typical of recent cores. In recent years, some W core designs have experienced increases in the measured value of $F_Q^C(Z)$ as high as six percent between monthly measurements over certain burnup ranges. To address this issue, W submitted to NRC a Revision 1 to WCAP-10216-P. For those cores that are predicted to have increases in $F_Q(Z)$ greater than two percent over certain burnup ranges, the WCAP provides for a larger penalty on a cycle-specific basis. The NRC staff approved Revision 1 to WCAP-10216-P and Westinghouse issued the approved version of the report, WCAP-10216-P-A, Revision 1A, in February 1994. TVA further reports that it has determined that a two percent penalty factor value is adequate for the current second fuel cycle and that any further increase in the penalty factor would apply to cycle 3 and subsequent cycles.

In the proposed amendments, TVA followed the guidance provided in GL 88-16. Specifically, the amendments included (1) relocation of the penalty factor to a defined formal report, the COLR, and (2) the addition of its associated reporting requirement to the Administrative Controls section of the TS, (TS 5.9.5).

The revised TS 5.9.5 includes a listing of the W topical reports providing the analytical methods used to determine the core operating limits. The listing indicates which methodology is used to calculate each core operating parameter. The applicable methodology, which has previously been approved by the NRC and is applicable to the WBN is given below:

3. WCAP-10216-P-A, Revision 1A, "Relaxation of Constant Axial Offset Control F(Q) Surveillance Technical Specification," February 1994 (W Proprietary).

   Methodology for Specifications 3.2.1 - Heat Flux Hot Channel Factor (W(Z) Surveillance Requirements for F(Q) Methodology) and 3.2.3 - Axial Flux Difference (Relaxed Axial Offset Control).

The calculation of the cycle-specific core operating limits will continue to be performed using the NRC-approved methodology listed above and included in TS 5.9.5. The use of NRC-approved methodologies will ensure that values of cycle-specific parameters will be determined so that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, emergency core cooling system limits, nuclear limits such as shutdown, and transient and accident limits) of the safety analysis are met. The relocation is implemented by removing the numerical values of the cycle-specific limits specified in TS 3.2.1.2 and replacing it with a reference to its new location in the COLR. The bases have also been revised consistent with these TS changes. The NRC staff finds these changes to be acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20, and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (63 FR 33109 dated June 17, 1998). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (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.

Principal Contributor: Robert E. Martin

Date: August 10, 1998