October 21, 1997

Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

SUBJECT: ISSUANCE OF AMENDMENT ON PRESSURE AND TEMPERATURE LIMITS REPORT (TAC NO. M99063)

Dear Mr. Kingsley:

The Commission has issued the enclosed Amendment No. 9 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant, Unit 1 (WBN). This amendment is in response to your application dated June 20, 1997. The requested changes would modify the facility's Technical Specifications to incorporate the use of Code Case N-514 into the methodology for the WBN Pressure-Temperature Limits Report.

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:

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. 9 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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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. 9
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 June 20, 1997, 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:

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(2) Technical Specifications and Environmental Protection Plan

The Technical Specifications contained in Appendix A, as revised through Amendment No. 9 , 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: October 21, 1997

ATTACHMENT TO AMENDMENT NO. 9

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
5.0-33	5.0-33
5.0-34	5.0-34

5.9 Reporting Requirements

5.9.5 CORE OPERATING LIMITS REPORT (COLR) (continued)

c. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling Systems (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

d. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.9.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. RCS pressure and temperature limits for heatup, cooldown, low temperature operation, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for the following:

LCO 3.4.3 RCS Pressure and Temperature (P/T) Limits
LCO 3.4.12Cold Overpressure Mitigation System (COMS)

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC. The acceptability of the analytical methods is documented in NRC letters, "WATTS BAR UNIT 1 - ACCEPTANCE FOR REFERENCING OF PRESSURE TEMPERATURE LIMITS METHODOLOGY AND PRESSURE TEMPERATURE LIMITS REPORT (TAC M89048)", September 22, 1995 and "EXEMPTION FROM THE REQUIREMENTS OF 10 CFR Part 50.60, ACCEPTANCE CRITERIA FOR FRACTURE PREVENTION MEASURES FOR LIGHTWATER NUCLEAR POWER REACTORS FOR NORMAL OPERATION - WATTS BAR NUCLEAR PLANT (TAC NO. M99063)", September 29, 1997. Specifically, the analytical methods are described in the following references:

1. Letter, W. J. Museler to NRC, regarding request for exemption from 10 CFR 50.60, March 10, 1994.

2. Letter, D. E. Nunn to NRC, regarding heatup and cooldown curves for normal operation (submitting WCAP-14176 and WCAP-14040, Rev. 1), December 23, 1994.

(continued)

5.9 Reporting Requirements

5.9.6 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR) (continued)

3. Letter, R. R. Baron to NRC, responding to NRC July 11, 1995, request for additional information, July 31, 1995.

4. Letter, R. R. Baron to NRC providing more information regarding cold overpressure mitigating system setpoints, September 8, 1995.

5. Letter, J. A. Scalice to NRC, regarding request for exemption from 10 CFR 50.60, concerning use of Code Case N-514 to determine LTOP setpoints, dated June 20, 1997.

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluency period and for any revision or supplement thereto.

5.9.7 EDG Failures Report

If an individual emergency diesel generator (EDG) experiences four or more valid failures in the last 25 demands, these failures and any nonvalid failures experienced by that EDG in that time period shall be reported within 30 days. Reports on EDG failures shall include the information recommended in Regulatory Guide 1.9, Revision 3, Regulatory Position C.4, or existing Regulatory Guide 1.108 reporting requirement.

5.9.8 PAMS Report

When a Report is required by Condition B or G of LCO 3.3.3, "Post Accident Monitoring (PAM) Instrumentation," a report shall be submitted within the following 14 days. The report shall outline the preplanned alternate method of monitoring, the cause of the inoperability, and the plans and schedule for restoring the instrumentation channels of the Function to OPERABLE status.

5.9.9 SG Tube Inspection Report

Following each inservice inspection of steam generator (SG) tubes, in accordance with the SG Tube Surveillance Program, the number of tubes plugged and tubes sleeved in each SG shall be reported to the NRC within 15 days.

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 9 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 June 20, 1997, the Tennessee Valley Authority (the licensee or TVA) submitted a request for changes to the Watts Bar Nuclear Plant (WBN) Technical Specifications (TS). The requested changes would modify the facility's TS to incorporate the use of Code Case N-514 into the methodology for the WBN Pressure-Temperature Limits Report (PTLR). The licensee also requested an exemption from the application of specific requirements of Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Section 60 and Appendix G. Specifically, TVA proposed to use American Society for Mechanical Engineers (ASME) Code Case N-514 to permit setting the pressure setpoint of the facility's Cold Overpressure Mitigation System (COMS) such that the pressure-temperature (P-T) limits required by 10 CFR Part 50, Appendix G could be exceeded by ten percent during a low temperature pressure transient. The request for the exemption was granted by NRC letter, "Exemption from the Requirements fo 10 CFR Part 50.60, Acceptance Criteria For Fracture Prevention Measures For Lightwater Nuclear Power Reactors For Normal Operation - Watts Bar Nuclear Plant, (TAC NO. M99063)", dated September 29, 1997.

2.0 EVALUATION

2.1 REGULATORY REQUIREMENTS

The Nuclear Regulatory Commission (NRC) has established requirements in 10 CFR Part 50 to protect the integrity of the reactor coolant system pressure boundary. As a part of these, 10 CFR Part 50 Appendix G requires that P-T limits be established for reactor pressure vessels (RPVs) during normal operation and vessel hydrostatic testing and as stated in Appendix G, "The appropriate requirements on...the pressure-temperature limits...must be met for all conditions." In order to protect these P-T limit curves and provide pressure relief during low temperature overpressurization events, pressurized water reactor licensees have installed protection systems (COMS/LTOPS) as part of the reactor coolant system pressure boundary.

Previously, licensees were required as part of a facility's TS to develop, update, and submit reactor vessel P-T limits and COMS setpoints for NRC review and approval. In conjunction with NRC's initiative to develop improved

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standard technical specifications for licensee adoption, the staff published Generic Letter (GL) 96-03 which provided a process by which licensees could relocate the reactor vessel P-T limits and COMS setpoints from the plant TS to a PTLR, an administratively controlled document. This would allow the licensee to update the facility's P-T limits and/or COMS setpoints without requesting NRC approval. However, the methodology that the licensee used to develop the PTLR would be referenced in the TS and any changes to this methodology must be submitted for NRC staff review. TVA incorporated the provision for a PTLR into the licensing basis for WBN during initial licensing of the facility.

2.2 LICENSEE'S DETERMINATION

TVA's letter dated June 20, 1997 submitted request for an exemption from the requirements of 10 CFR 50.60 and a request for a change to the associated TS to enable WBN to use ASME Code Case N-514 as an alternative method for determining the COMS pressure setpoint. Although the licensee's request for exemption has been addressed in separate correspondence, the basis for the granting of the exemption is discussed here to provide support for the associated change to the TS. The licensee determined that the exemption request from the provisions of 10 CFR 50.60 and Appendix G was necessary since these regulations require, as noted above, that reactor vessel conditions not exceed the P-T limits established by Appendix G. In referring to 10 CFR 50.12 on specific exemptions, TVA cited two special circumstances, 10 CFR 50.12(a)(2)(ii) on achieving the underlying purpose of the regulations and 10 CFR 50.12(a)(2)(iii) on undue hardship.

TVA noted in support of the (ii) criteria that the underlying purpose of the subject regulations is to establish limits to protect the reactor vessel from brittle failure during low temperature operation and that the COMS provides a physical means of protecting these limits. TVA proposed that establishing the COMS pressure setpoint per the N-514 provisions such that the vessel pressure would not exceed 110 percent of the P-T limit allowables would still provide an acceptable level of safety and mitigate the potential for an unnecessary actuation of the COMS. The finding of an "acceptable level of safety" while using N-514 was made based on the conservatisms which have been explicitly incorporated into the procedure for developing the P-T limit curves. This procedure, referenced from Appendix G to Section XI of the ASME Code, includes the following conservatisms: (1) a safety factor of 2 on the pressure stresses; (2) a margin factor applied to RT_{NDT} using Regulatory Guide 1.99, Revision 2; (3) an assumed 1/4 T flaw with a 6:1 aspect ratio; (4) a limiting material toughness based on dynamic and crack arrest data.

With respect to the 10 CFR 50.12(a)(iii) criterion, TVA explained that a COMS pressure setpoint which did not incorporate the 110 percent allowance of N-514 would impose an operational or economic hardship on the facility. The hardship would occur due to a restricted "operating window" in pressure and temperature between the COMS setpoint and the minimum pressure necessary to operate the reactor coolant pumps (RCP). The window narrows due to the shift in the P-T limit curves caused by a reduction in the pressure vessel material's fracture toughness with irradiation damage. According to TVA, this would result in "an excessive delay" which would be required to elevate the

reactor coolant system (RCS) temperature by external means prior to starting an RCP and "could introduce undesirable thermal transients in the RCS."

TVA's license amendment request entailed a change to WBN TS 5.9.6 "Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)." The change would incorporate the letter of June 20, 1997 and the NRC's approval as part of the basis for the WBN PTLR methodology. As noted in Section 2.0 above, an amendment request for NRC approval is required in accordance with the provisions of GL 96-03 since the PTLR is a licensee-controlled document and can be modified by TVA without requesting NRC approval, provided that an NRC-approved methodology is used.

3.0 STAFF EVALUATION

The staff examined the regulatory bases for TVA's exemption and license amendment requests. The staff agreed with TVA's determination that an exemption would be required to approve the use of Code Case N-514 and that a license amendment would be necessary to incorporate N-514 into the WBN PTLR methodology.

The staff examined TVA's rationale to support the exemption request and agrees that the use of N-514 will also meet the underlying intent of the regulations. Based upon a consideration of the conservatisms which are explicitly defined in the Appendix G methodology (as listed above), the staff concluded that permitting the COMS setpoint to be established 10 percent above the limit defined by the P-T limit curves would provide an adequate margin of safety against brittle failure of the reactor vessel. This is also consistent with the determination that the staff has reached for other licensees under similar conditions based on the same considerations. Therefore, requesting the exemption under the special circumstances of 10 CFR 50.12(a)(2)(ii) was found to be appropriate. Accordingly, the staff has granted an exemption, by letter dated September 29, 1997, from the requirements of 10 CFR 50.60 and Appendix G to allow TVA to apply the methods in ASME Code Case N-514 for the determination of the WBN COMS pressure setpoint in the WBN PTLR.

However, the staff concludes that, with respect to the criterion in 10 CFR 50.12(a)(2)(iii), although the reduction in operational flexibility cited by TVA appears to be factual, TVA did not demonstrate that the constraint constitutes a hardship for WBN at this time "significantly in excess of those incurred by other facilities similarly situated" nor did TVA demonstrate that the costs were "significantly in excess of those contemplated when the regulation was adopted....." Accordingly, the staff did not rely on these bases in its letter of September 29, 1997, granting the exemption.

The staff finds that the changes to TS 5.9.6.b appropriately document the requested change in the WBN PTLR methodology. Therefore, the staff concludes that the inclusion of the letter dated June 20, 1997 from TVA to the NRC conveying the N-514 exemption and license amendment request, and the documentation of the NRC approval letter acceptably serve as a supplement to an NRC-approved methodology for the construction of the WBN PTLR. Accordingly the staff concludes that the proposed change to WBN TS 5.9.6 is acceptable

since it adequately documents the change in the PTLR methodology by the exemption issued by the staff's letter dated September 29, 1997.

4.0 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.

5.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact was published in the *Federal Register* on September 26, 1997 (62 FR 50630). In this finding, the Commission determined that issuance of these amendments would not have a significant effect on the quality of the human environment.

6.0 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: M. Mitchell

Date: **October 21, 1997**