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

January 15, 1999

SUBJECT: ISSUANCE OF AMENDMENT REGARDING DELETION OF NEGATIVE FLUX RATE TRIP FOR THE WATTS BAR NUCLEAR PLANT, UNIT 1 (TAC NO. MA2228)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. 18 to Facility Operating License No. NPF-90 for Watts Bar Nuclear Plant, Unit 1. This amendment is in response to your application dated June 26, 1998, as supplemented November 5, 1998. The amendment authorizes the deletion of the power range neutron flux high negative rate reactor trip function based on the analysis provided in Westinghouse Electric Corporation WCAP-11394-P-A, "Methodology for the Analysis of the Dropped Rod Event." The attached Amendment to the Facility Operating License incorporates a commitment by TVA to modify its administrative procedure to ensure that a dropped rod analysis is successfully performed each fuel cycle in accordance with the methodology in the report, WCAP-11394-P-A, dated October 23, 1989.

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. to NPF-90
2. Safety Evaluation

cc w/encls: 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. 18
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 26, 1998, as supplemented November 5, 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. 18 , 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 prior to startup following the second refueling outage. In accordance with the licensee's letter dated November 5, 1998, the licensee will modify its administrative procedure to ensure that a dropped rod analysis is successfully performed each fuel cycle in accordance with the methodology in the report, WCAP-11394-P-A, dated October 23, 1989.

FOR THE NUCLEAR REGULATORY COMMISSION

Cecil O. Thomas, 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: January 15, 1999

ATTACHMENT TO AMENDMENT NO. 18

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 |
|---|---|
| 3.3-15 | 3.3-15 |
| B 3.3-12 | B 3.3-12 |
| B 3.3-13 | B 3.3-13 |
| B 3.3-42 | B 3.3-42 |

Table 3.3.1-1 (page 1 of 9)
Reactor Trip System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT |
|---|---|---|---|---|---|---|
| 1. Manual Reactor Trip | 1,2 | 2 | B | SR 3.3.1.13 | NA | NA |
| | 3[a], 4[a], 5[a] | 2 | C | SR 3.3.1.13 | NA | NA |
| 2. Power Range Neutron Flux | | | | | | |
| a. High | 1,2 | 4 | D | SR 3.3.1.1<br>SR 3.3.1.2<br>SR 3.3.1.7<br>SR 3.3.1.11<br>SR 3.3.1.15 | ≤ 111.4% RTP | 109% RTP |
| b. Low | 1[b],2 | 4 | E | SR 3.3.1.1<br>SR 3.3.1.7<br>SR 3.3.1.11<br>SR 3.3.1.15 | ≤ 27.4% RTP | 25% RTP |
| 3. Power Range Neutron Flux Rate | | | | | | |
| a. High Positive Rate | 1,2 | 4 | E | SR 3.3.1.7<br>SR 3.3.1.11 | ≤ 6.3% RTP with time constant ≥ 2 sec | 5% RTP with time constant ≥ 2 sec |
| b. High Negative Rate - Deleted | | | | | | |
| 4. Intermediate Range Neutron Flux | 1[b], 2[c] | 2 | F,G | SR 3.3.1.1<br>SR 3.3.1.8<br>SR 3.3.1.11 | ≤ 40% RTP | 25% RTP |
| | 2[d] | 2 | H | SR 3.3.1.1<br>SR 3.3.1.8<br>SR 3.3.1.11 | ≤ 40% RTP | 25% RTP |

(continued)

(a) With Reactor Trip Breakers (RTBs) closed and Rod Control System capable of rod withdrawal.

(b) Below the P-10 (Power Range Neutron Flux) interlocks.

(c) Above the P-6 (Intermediate Range Neutron Flux) interlocks.

(d) Below the P-6 (Intermediate Range Neutron Flux) interlocks.

BASES

APPLICABLE SAFETY ANALYSES. LCO. and APPLICABILITY

b. Power Range Neutron Flux- (continued)

In MODE 3. 4. 5. or 6. the Power Range Neutron Flux-Low trip Function does not have to be OPERABLE because the reactor is shut down and the NIS power range detectors cannot detect neutron levels in this range. Other RTS trip Functions and administrative controls provide protection against positive reactivity additions or power excursions in MODE 3. 4. 5. or 6.

3. Power Range Neutron Flux Rate

The Power Range Neutron Flux Rate trip uses the same channels as discussed for Function 2 above.

a. Power Range Neutron Flux-High Positive Rate

The Power Range Neutron Flux-High Positive Rate trip Function ensures that protection is provided against rapid increases in neutron flux that are characteristic of an RCCA drive rod housing rupture and the accompanying ejection of the RCCA. This Function compliments the Power Range Neutron Flux-High and Low Setpoint trip Functions to ensure that the criteria are met for a rod ejection from the power range.

The LCO requires all four of the Power Range Neutron Flux-High Positive Rate channels to be OPERABLE.

In MODE 1 or 2. when there is a potential to add a large amount of positive reactivity from a rod ejection accident (REA). the Power Range Neutron Flux-High Positive Rate trip must be OPERABLE. In MODE 3. 4. 5. or 6. the Power Range Neutron Flux-High Positive Rate trip Function does not have to be OPERABLE because other RTS trip Functions and administrative controls will provide protection against positive reactivity additions. Also. since only the shutdown banks may be withdrawn in MODE 3. 4. or 5. the remaining complement of control bank worth ensures a sufficient degree of SDM in the event

(continued)

BASES

APPLICABLE SAFETY ANALYSES, LCO, and APPLICABILITY

a. Power Range Neutron Flux-High Positive Rate (continued)

of an REA. In MODE 6, no rods are withdrawn and the SDM is increased during refueling operations. The reactor vessel head is also removed or the closure bolts are detensioned preventing any pressure buildup. In addition, the NIS power range detectors cannot detect neutron levels present in this MODE.

b. Power Range Neutron Flux - High Negative Rate -

Deleted

(continued)

ACTIONS

D.1.1, D.1.2, D.2.1, D.2.2, and D (continued)

allows placing the inoperable channel in the bypass condition to allow setpoint adjustments of other channels when required to reduce the setpoint in accordance with other Technical Specifications. The 4 hour time limit is justified in Reference 7.

Required Action D.2.2 has been modified by a Note which only requires SR 3.2.4.2 to be performed if the Power Range Neutron Flux input to QPTR becomes inoperable. Failure of a component in the Power Range Neutron Flux channel which renders the High Flux trip Function inoperable may not affect the capability to monitor QPTR. As such, determining QPTR using the movable incore detectors once per 12 hours may not be necessary.

E.1 and E.2

Condition E applies to the following reactor trip Functions:

- Power Range Neutron Flux–Low; and
- Power Range Neutron Flux–High Positive Rate

A known inoperable channel must be placed in the tripped condition within 6 hours. Placing the channel in the tripped condition results in a partial trip condition requiring only one-out-of-two logic for actuation of the two-out-of-three trips and one-out-of-three logic for actuation of the two-out-of-four trips. The 6 hours allowed to place the inoperable channel in the tripped condition is justified in Reference 7.

If the inoperable channel cannot be placed in the trip condition within the specified Completion Time, the plant must be placed in a MODE where these Functions are not required OPERABLE. An additional 6 hours is allowed to place the plant in MODE 3. Six hours is a reasonable time, based on operating experience, to place the plant in MODE 3 from full power in an orderly manner and without challenging plant systems.

The Required Actions have been modified by a Note that allows placing the inoperable channel in the bypassed condition for up to 4 hours while performing routine surveillance testing of the other channels. The 4 hour time limit is justified in Reference 7.

(continued)

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 18 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 26, 1998, as supplemented November 5, 1998, the Tennessee Valley Authority (the licensee) submitted a request for changes to the Watts Bar Nuclear Plant (WBN), Unit 1, Technical Specifications (TS). The requested changes would allow the deletion of the power range neutron flux high negative rate reactor trip function based on the analysis provided in Westinghouse (W) Electric Corporation WCAP-11394-A, "Methodology for the Analysis of the Dropped Rod Event." The proposed change would eliminate an unnecessary protective function and thereby reduce the potential for a transient which could challenge safe plant operation due to spurious trip signals. The November 5, 1998 letter provided clarifying information that did not change the initial proposed no significant hazards consideration determination.

## 2.0 EVALUATION

The original design basis for the negative flux rate trip function was to mitigate the consequences of a dropped rod(s) event. The intent was that, in the event of a dropped rod (or bank), the reactor protection system would detect the rapidly decreasing neutron flux due to the dropped rod(s) and trip the reactor, thus ending the transient and assuring that departure-from-nucleate-boiling limits were maintained. In January 1982, W submitted a topical report entitled, "Dropped Rod Methodology for Negative Flux Rate Trip Plants," (WCAP-10297), which documented a new methodology for this event and concluded that the negative flux rate trip was required only when a dropped rod (or bank) exceeded a threshold value reactivity worth. The threshold value was dependent upon plant design (2, 3 or 4 loop) and fuel type. The U.S. Nuclear Regulatory commission (NRC) approved this methodology in a letter dated March 31, 1983 to W. By letter dated May 22, 1987, the W Owner's Group submitted a new topical report entitled, "Methodology for the Analysis of the Dropped Rod Event," (WCAP-11394-P). The conclusion reached in WCAP-11394-P was that sufficient margin is expected with all W plant designs and fuel types, such that the negative flux rate trip is not required regardless of the worth of the dropped rod (or bank), subject to a plant/cycle-specific analysis. NRC staff reviewed and approved the W analysis and the results, and concluded that this approach was acceptable for analyzing the dropped rod event for which no credit is taken for any direct trip or automatic power reduction features. In the approval, the NRC noted that further review by the

ENCLOSURE

NRC staff for each cycle is not necessary, given the utility assertion that the analysis described in WCAP-11394-P has been performed and the required comparisons have been made with favorable results.

Review of the WBN safety analysis provided the following conclusions:

> The negative flux rate trip is not credited in the loss-of-coolant accident (LOCA) and LOCA related evaluations, the containment integrity evaluation, the main steamline break and energy release evaluation and the steam generator tube rupture evaluation.
>
> The negative flux rate trip has no impact on the safety systems setpoints, the emergency operating procedures, and the reactor coolant system component integrity.
>
> The current WBN non-LOCA safety analyses do not take credit for the power range negative flux rate trip function. The dropped rod or bank analysis was performed using the methodology in WCAP-11394-P-A.

The licensee provided a commitment, in a letter dated November 5, 1998, to use the WCAP11394-P-A methodology for future fuel cycles as follows:

> TVA will include a line-item verification in appropriate Nuclear Fuel administrative procedures to ensure that a dropped rod analysis is successfully performed each fuel cycle in accordance with the methodology described in W topical report, WCAP-11394-P-A, "Methodology for the analysis of the Dropped Rod Event," October 23, 1989.

The above TVA commitment has been incorporated into the Watts Bar facility license by inclusion in paragraph 3 of the Amendment to Facility Operating License issued with this Safety Evaluation. The NRC staff concludes that, based on this evaluation, the proposed TS changes to delete the power range neutron flux high negative rate reactor trip are acceptable.

Consistency With 10 CFR 50.36

In 10 CFR 50.36, the Commission established its regulatory requirements related to the content of TS. In doing so, the Commission placed emphasis on those matters related to the prevention of accidents and the mitigation of accident consequences; the Commisson noted that applicants were expected to incorporate into their TS "those items that are directly related to maintaining the integrity of the physical barriers designed to contain radioactivity." Statement of Consideration, "Technical Specifications for Facility Licenses; Safety Analysis Reports," 33 FR 18610 (December 17, 1968). The criteria to be used in determining which of the limiting conditions for operation should remain in the TS are set forth in 10 CFR 50.36(c). These four criteria, and the relationship of this change in the WBN TS to the criteria are as follows:

Criterion 1 - Installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary.

As noted above, the purpose of the negative flux rate trip function was, in the event of a dropped control rod (or bank), to sense the rapidly decreasing neutron flux and trip the reactor to ensure that DNB limits are maintained. This does not relate directly to degradation of the reactor coolant pressure boundary and, accordingly, this criterion is not applicable.

Criterion 2 - A process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

As discussed above, subject to the performance of an analysis by the licensee for each fuel cycle to demonstrate the acceptability of the consequences of a dropped rod event, the subject trip function is not required for the design basis accident and transient analyses to demonstrate acceptable results. Accordingly, this criterion is not applicable. The NRC staff further notes that this change represents a transition in ensuring protection from DNB reliance on a trip function to reliance on appropriate analyses conducted prior to each fuel cycle as contained in Paragraph 3 of the Amendment to Facility Operating License.

Criterion 3 - A structure, system or component that is a part of the primary success path and which functions or actuates to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

As discussed above, subject to the performance of an analysis by the licensee for each fuel cycle to demonstrate the acceptability of the consequences of a dropped rod event, the subject trip function is not credited in the design basis accident and transient analyses. Accordingly, this criterion is not applicable.

Criterion 4 - A structure, system or component which operating experience or probabilistic safety assessment has shown to be significant to public health and safety.

As noted in the above evaluation, the negative flux rate trip is not credited in design basis accident and transient analyses and has no impact on safety system setpoints, procedures nor reactor coolant system component integrity. Accordingly, the NRC staff concludes that inclusion of the trip function in the TS is not significant to public health and safety and that this criterion is not applicable.

## 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. 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 40562, dated July 29, 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: M. Chatterton
R. Martin

Date: January 15, 1999