



**Tennessee Valley Authority**, Post Office Box 2000, Spring City, Tennessee 37381-2000

**AUG 22 2003**

WBN-TS-03-03

10 CFR 50.90

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

Gentlemen:

In the Matter of                                 )  
Tennessee Valley Authority                 )

Docket No.50-390

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - TECHNICAL SPECIFICATION  
(TS) CHANGE NO. 03-03 - SOURCE RANGE NEUTRON FLUX REACTOR TRIP  
FUNCTION RESPONSE TIME TEST

Pursuant to 10 CFR 50.90, TVA is submitting a request for a TS change (WBN-TS-03-03) to license NPF-90 for WBN Unit 1. The proposed TS change revises Technical Specification Table 3.3.1-1, "Reactor Trip System Instrumentation," to add Surveillance Requirement 3.3.1.15 to the Source Range Neutron Flux Reactor Trip function. The proposed change results from review of Westinghouse Nuclear Safety Advisory Letter (NSAL) 00-016 in which it was noted that the Source Range (SR) Neutron Flux Reactor Trip is implicitly credited in the accident analyses for the Uncontrolled Rod Cluster Control Assembly Bank Withdrawal from Subcritical (RWFS) event during Modes 3, 4, and 5.

Enclosure 1 to this letter provides the description and evaluation of the proposed change. TVA has determined that the proposed change does not involve a significant hazards consideration, and that the TS change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter

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and attachments to the Tennessee State Department of Public Health.

Enclosure 2 contains copies of the appropriate TS page marked-up to show the proposed change. Enclosure 3 contains a information only marked-up version of the proposed change to the Technical Requirements Manual.

TVA requests approval of this TS amendment in about one year of the date of this letter and that the implementation of the revised TS be effective 30 days from NRC's approval. As part of the proposed license amendment request, no commitments have been made by TVA.

This letter is being sent in accordance with NRC Regulatory Issue Summary 2001-05, "Guidance on Submitting documents to the NRC by Electronic Information Exchange or CD-ROM."

If you have any questions about this change, please contact me at (423) 365-1824.

I declare under penalty of perjury that the foregoing is true and correct. Executed on 22<sup>nd</sup> day of August, 2003.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. L. Pace', with a stylized flourish at the end.

P. L. Pace  
Manager, Site Licensing  
and Industry Affairs

Enclosures:

1. TVA's Evaluation of the Proposed Change
2. Proposed Technical Specification Changes (marked-up)
3. Technical Requirements Manual Mark-up (Information Only)

cc: See page 3

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cc (Enclosures):

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## ENCLOSURE 1

### TENNESSEE VALLEY AUTHORITY WATTS BARS BAR NUCLEAR PLANT (WBN) UNIT 1

#### TVA EVALUATION OF PROPOSED CHANGE

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##### 1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-90 for WBN Unit 1. The proposed license amendment will require the periodic verification of the response time of the source range reactor trip function. The source range reactor trip provides the primary protection for the rod withdrawal from subcritical event in Modes 3, 4, and 5. This trip function is not currently required to be response time tested.

The proposed change results from review of Westinghouse Nuclear Safety Advisory Letter (NSAL) 00-016, "Rod Withdrawal from Subcritical Protection in Lower Modes," in which it was noted that the source range (SR) neutron flux reactor trip is implicitly credited in the accident analyses for the Uncontrolled Rod Cluster Control Assembly Bank Withdrawal from Subcritical (RWFS) event during Modes 3, 4, and 5. In these modes, since the power range neutron flux-low setpoint trip function is not required to be operable, the SR reactor trip provides the primary protection for this event.

Therefore, the response time of the SR reactor trip function must be verified consistent with the analysis assumptions.

##### 2.0 PROPOSED CHANGE

The proposed amendment will revise Table 3.3.1-1 (page 2 of 9), Reactor Trip System Instrumentation, of the WBN Technical Specifications (TS) by adding Surveillance Requirement 3.3.1-15 to Function 5, "Source Range Neutron Flux." As a result, Table 3.3.1-1 of the Technical Requirements Manual (TRM) will be revised to include the required function response time of less than or equal to 0.5 seconds. A copy of this change is provided for information in Enclosure 3. No changes are required to the TS Bases.

##### 3.0 BACKGROUND

Westinghouse, NSAL-00-016, identified an issue concerning the protection functions assumed for the RWFS event. The primary protection for the RWFS event is provided by the Power Range Neutron Flux - Low Setpoint, which is required to be operable in plant operating Modes 1 and 2 only. The SR trip is also identified in Updated Final Safety Analysis Report (UFSAR),

Section 15.2.1 as being available to terminate this event. An RWFS event in Modes 3, 4 and 5 has been considered to be bounded by the RWFS analysis performed for Mode 2. Since the power range trip is not required to be operable in these lower Modes, the SR reactor trip function, although not explicitly analyzed, is implicitly credited as the primary protective function. Technical Specification 3.3.1 requires the SR trip function to be operable in Modes 3, 4 and 5 only when the rods are capable of being withdrawn, i.e., when the reactor trip breakers are closed. To be credited as the primary protective function for this event, it is implicit that the response time of the SR function must be verified consistent with the analysis assumptions. Although required to be operable in these modes, the source range channels are not currently required by the Technical Specifications to be response time tested.

During the development of the proposed amendment, steps were taken to ensure this change is consistent with changes being made within the nuclear industry. The WBN proposal is similar to the amendment approved for V. C. Summer Nuclear Station on March 8, 2002. Although there are differences in format between WBN and Summer Nuclear Station Technical Specifications, both changes result from Westinghouse's NSAL 00-016.

#### **4.0 TECHNICAL ANALYSIS**

The source range neutron flux reactor trip function provides protection against control rod withdrawal from subcritical during reactor startup and shutdown. This function trips the reactor when one of the two source range channels exceeds the trip setpoint. Both channels of the SR trip function are required to be operable during Mode 2 below the Intermediate Range Neutron Flux P-6 interlock and during Modes 3, 4, and 5 when the reactor trip breakers are closed and the control rod drive system is capable of rod withdrawal. The SR channels are classified as Class 1E and Seismic Category I.

The RWFS event is addressed in Section 15.2.1 of the UFSAR. The analysis is performed assuming bounding, Mode 2 initial conditions, and primary protection is provided by the Power Range Neutron Flux-Low Setpoint. This trip function is required to be operable during Modes 1 and 2 and has a response time requirement of 0.5 seconds consistent with the accident analyses. The SR reactor trip function is also identified in the UFSAR as being available to terminate this event; however, it is not explicitly credited in the analyses. Instead, as described in NSAL-00-016, it is assumed that a RWFS event occurring in Modes 3, 4, or 5 is bounded by the UFSAR analysis performed for Mode 2, based on implicitly crediting the SR reactor trip function. Therefore, the SR reactor trip is the primary protective function for this event in Modes 3, 4, or 5.

Verification of response time per the Technical Specifications ensures that protective function actuation times are less than or equal to the values assumed in the accident analyses. Since the SR reactor trip has been determined to be a primary protective function, a response time requirement is proposed for the function and a value of 0.5 seconds will be assigned. This value was recommended in NSAL-00-016 and is consistent with the delay time assumed for the Power Range Neutron Flux trips. A response time of 0.5 seconds will provide assurance that a RWFS event in Modes 3, 4, or 5 would remain bounded by the current analysis and the reactor would be shutdown before any significant power is generated. Consistent with the current TS requirement which exempts neutron detectors from response time testing, the response time value of 0.5 seconds includes the time interval from when a detector pulse is generated until loss of stationary gripper coil voltage (i.e., rods free to fall). Previous response time testing of the SR reactor trip function at WBN demonstrated that the proposed response time requirement can be achieved by the SR trip instrumentation and provide reasonable assurance that had a RWFS event occurred previously in Modes 3, 4, or 5 the SR Reactor Trip function would have accomplished its required safety function.

The proposed change enhances the operability requirements for the SR Neutron Flux channels. The required periodic response time testing of the SR reactor trip function will provide additional assurance that the SR reactor trip function is completed within the time limit assumed in the accident analyses.

## **5.0 REGULATORY SAFETY ANALYSIS**

### **5.1 No Significant Hazards Consideration**

The proposed amendment will require periodic verification of the response time of the source range (SR) reactor trip function, providing assurance that the SR reactor trip function will be completed within the time limit assumed in the accident analyses. Implementation of this change will not involve any modifications to the SR channels and is considered an enhancement to the operability requirements of the function. The following evaluates whether or not the change involves any significant hazards considerations:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed amendment enhances the operability of the SR reactor trip channels by requiring response time testing. This will provide additional assurance that the plant will be operated within its design and licensing basis. The change does not involve any physical modifications or functional

design changes to the SR instrumentation, and will not alter any system interfaces. The design standards, criteria, and material specifications applicable to the design and installation of the SR instrumentation still apply. The performance of response time testing for the SR Neutron Flux channels does not contribute to the initiation of any accident previously evaluated. Testing will be performed when the SR reactor trip function is not required to be operable. A response time will ensure that a Uncontrolled Rod cluster Control Assembly Bank Withdrawal from Subcritical (RWFS) event in Modes 3, 4, or 5 remains bounded by the current analysis and the reactor would be shutdown before any significant power is generated. Thus, the probability of occurrence of an accident evaluated in the Updated Final Safety Analysis Report (UFSAR) will not increase as a result of the performance of response time testing. The performance of response time testing will not affect any radiological barriers. The testing will not alter any operator responses required for accident mitigation and will not change any assumptions made in evaluating radiological consequences of an accident described in the UFSAR. The consequences of an RWFS event occurring from Mode 3, 4, or 5 are less severe than from Mode 2 since reactivity levels are lower in the lower modes. Therefore, there is no potential for an increase in the consequences of any previously evaluated accident.

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

Response: No.

The proposed change will not require any changes to hardware, setpoints, or design functions. The addition of a response time test requirement will not change the way the system is operated but will impose more restrictive operability requirements for the SR reactor trip function. This enhancement to the operability requirements for a protection system function is not considered an accident initiator. Therefore, the activity will not create a new or different kind of accident from those previously evaluated in the UFSAR.

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

Response: No.

The proposed change does not involve any changes to setpoints or safety limits. The required response time is consistent with the current accident analysis described in UFSAR and will ensure that a RWFS event in Modes 3, 4, or 5 remains bounded by the current analysis. The addition of a response time verification requirement is an enhancement to the operability

requirements of the SR reactor trip channels and does not reduce the margin of safety.

Based on the above, TVA concludes that the proposed amendment does 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.

## **5.2 Applicable Regulatory Requirements/Criteria**

The proposed amendment requests changes TS Table 3.3.1-1 (page 2 of 9) to add SR 3.3.1.15 to the Source Range Neutron Flux Reaction Trip function.

The Source Range Neutron Flux system along with its testing requirements and accident functions are discussed in UFSAR Sections 1.2.2.3, 4.2.3.2.1, 4.4.5.3, 7.2, 7.4, 7.7.1.3.1, 15.2.1. For these sections, the principal review performed by NRC is documented in NUREG-0847, "Safety Evaluation Report (SER) related to the operation of Watts Bar Nuclear Plant Units 1 and 2, Docket Nos. 50-390 and 50-391," dated June 1982. The assessment of these functions is documented in the following sections of the SER:

7.0, "Instrumentation and Controls"

15.2.4, "Reactivity and Power Distribution Anomalies"

The staff evaluated the Watts Bar instrumentation and control systems using the criteria set forth in NUREG-0800, Standard Review Plan (SRP) Table 7-1 (NUREG-75/087, Revision 1). These criteria include the GDC of 10 CFR 50, Appendix A, the Institute of Electrical and Electronic Engineers (IEEE) Standards (including IEEE 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations"), Regulatory Guides, and Branch Technical Positions (BTPs).

The proposal to require periodic verification of response time of the SR reactor trip channels will not involve any changes to the system hardware, design functions, setpoints, or operational requirements. The performance of response time testing will be in accordance with the established design basis requirements which implement the applicable regulatory requirements. The testing will provide additional assurance that a RWFS event in Modes 3, 4, or 5 will remain bounded by the current UFSAR analysis and the reactor would be shutdown before any significant power is generated.

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.



## **6.0 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 effluent 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)(q). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

## **7.0 REFERENCES**

1. WBN Updated Final Safety Analysis Report, Amendment 3, dated August 30, 2002.
2. NUREG-0847, "Safety Evaluation Report (SER), related to the operation of Watts Bar Nuclear Plant Units 1 and 2, Docket Nos. 50-390 and 50-391," dated June 1982
3. Institute of Electrical and Electronic Engineers (IEEE) Standard 279-1971, "Criteria for Protection Systems for Nuclear Power Generating Stations"

**ENCLOSURE 2**

**WBN-TS-03-03**

**TABLE 3.3.1-1 (PAGE 2 OF 9)  
REACTOR TRIP SYSTEM INSTRUMENTATION**

**PROPOSED TECHNICAL SPECIFICATION PAGE MARKUP**

**ADD**  
**SR 3.3.1.15**

**Table 3.3.1-1 (page 2 of 9)**  
**Reactor Trip System Instrumentation**

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
5. Source Range Neutron Flux	2 <sup>(d)</sup>	2	I, J	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 1.5 E5 cps	1.0 E5 cps
	3 <sup>(a)</sup> , 4 <sup>(a)</sup> , 5 <sup>(a)</sup>	2	J, K	SR 3.3.1.1 SR 3.3.1.8 SR 3.3.1.11	≤ 1.5 E5 cps	1.0 E5 cps
	3 <sup>(e)</sup> , 4 <sup>(e)</sup> , 5 <sup>(e)</sup>	1	L	SR 3.3.1.1 SR 3.3.1.11	N/A	N/A
6. Overtemperature ΔT	1, 2	4	W	SR 3.3.1.1 SR 3.3.1.3 SR 3.3.1.6 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 1 (Page 3.3-21)	Refer to Note 1 (Page 3.3-21)
7. Overpower ΔT	1, 2	4	W	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	Refer to Note 2 (Page 3.3-22)	Refer to Note 2 (Page 3.3-22)
8. Pressurizer Pressure						
a. Low	1 <sup>(f)</sup>	4	X	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≥ 1964.8 psig	1970 psig
b. High	1, 2	4	W	SR 3.3.1.1 SR 3.3.1.7 SR 3.3.1.10 SR 3.3.1.15	≤ 2390.2 psig	2385 psig

(continued)

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

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

(e) With the RTBs open. In this condition, source range Function does not provide reactor trip but does provide indication.

(f) Above the P-7 (Low Power Reactor Trips Block) interlock.

**ENCLOSURE 3**

**WBN-TS-03-03**

**TECHNICAL REQUIREMENTS MANUAL PAGE 3.3-3, TABLE 3.3.1-1**

**PROPOSED TECHNICAL REQUIREMENTS MANUAL PAGE MARKUP  
INFORMATION ONLY**

Table 3.3.1-1 (Page 1 of 2)  
Reactor Trip System Instrumentation Response Times

FUNCTIONAL UNIT	RESPONSE TIME
1. Manual Reactor Trip	N.A.
2. Power Range, Neutron Flux	
a. High	$\leq 0.5$ second <sup>(1)</sup>
b. Low	$\leq 0.5$ second <sup>(1)</sup>
3. Power Range, Neutron Flux	
a. High Positive Rate	N.A.
b. High Negative Rate	Deleted
4. Intermediate Range, Neutron Flux	N.A.
5. Source Range, Neutron Flux	N.A.
6. Overtemperature $\Delta T$	$\leq 8$ seconds <sup>(1)</sup>
7. Overpower $\Delta T$	$\leq 8$ seconds <sup>(1)</sup>
8. Pressurizer Pressure	
a. Low	$\leq 2$ seconds
b. High	$\leq 2$ seconds
9. Pressurizer Water Level--High	N.A.

REPLACE WITH

$\leq 0.5$  second<sup>(1)</sup>

(continued)

<sup>(1)</sup> Neutron detectors are exempt from response time testing. Response time of the neutron flux signal portion of the channel shall be measured from the detector output or input of first electronic component in channel.