



Tennessee Valley Authority, Post Office Box 2000, Soddy-Daisy, Tennessee 37384-2000

September 1, 2005

TVA-SQN-TS-05-04

10 CFR 50.90

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D. C. 20555-0001

Gentlemen:

In the Matter of ) Docket Nos. 50-327  
Tennessee Valley Authority ) 50-328

**SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2 - TECHNICAL SPECIFICATIONS (TS) CHANGE 05-04 "REVISION OF ALLOWABLE VALUE FOR REACTOR TRIP SYSTEM-TURBINE TRIP ON LOW TRIP SYSTEM PRESSURE"**

Pursuant to 10 CFR 50.90, Tennessee Valley Authority (TVA) is submitting a request for a TS change (TS-05-04) to Licenses DPR-77 and DPR-79 for SQN Units 1 and 2. The proposed TS change will revise the reactor protection system turbine trip allowable value for low trip system pressure from greater than or equal to 43 pounds per square inch gauge (psig) to 39.5 psig. This change affects Functional Unit 17.A of Specification 2.2.1, "Reactor Trip System Instrumentation Setpoints," in Table 2.2-1.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS change qualifies for categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9).

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Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Tennessee State Department of Public Health.

There is no specific timeframe in which the licensee needs this change and therefore, normal NRC processing is requested. TVA requests that the implementation of the revised TS be within 45 days of NRC approval.

There are no commitments contained in this submittal.

If you have any questions about this change, please contact me at 843-7170 or Jim Smith at 843-6672.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 1<sup>st</sup> day of September, 2005.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. L. Pace', with a long horizontal flourish extending to the left.

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

Enclosures:

1. TVA Evaluation of the Proposed Changes
2. Proposed Technical Specifications Changes (mark-up)

cc: See page 3

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Enclosures

cc (Enclosures):

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## ENCLOSURE 1

### TENNESSEE VALLEY AUTHORITY (TVA) SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

#### 1.0 DESCRIPTION

This letter is a request to amend Operating Licenses DPR-77 and DPR-79 for SQN Units 1 and 2. The proposed change would revise the allowable value for the low trip system pressure input to the reactor trip system that indicates a turbine trip condition. The present allowable value for this function is greater than or equal to 43 pounds per square inch (psig) and the proposed allowable value is 39.5 psig. This proposed change will allow the instrumentation that performs this trip function to be tested and verified to be operable within the capabilities of the pressure switches. The current allowable value is not reasonable based on the design capabilities of the instrumentation.

#### 2.0 PROPOSED CHANGE

The proposed change will revise Technical Specification (TS) 2.2.1, Functional Unit 17.A allowable value in TS Table 2.2-1. This function monitors the main turbine low trip system pressure and generates an anticipatory trip of the reactor in the event the pressure drops below a predetermined value. The current allowable value is greater than or equal to 43 psig and the proposed value is greater than or equal to 39.5 psig. The trip setpoint will remain at the current value of greater than or equal to 45 psig. This change will not affect other portions of the TSs or Bases.

In summary, the proposed change will revise the allowable value for reactor trip generation on a turbine trip resulting from low trip system pressure.

#### 3.0 BACKGROUND

The turbine trip-reactor trip is actuated by a two out of three logic from low autostop oil pressure signals or by all closed signals from the turbine steam stop valves. A turbine trip causes a direct reactor trip above P-9 setpoint.

The reactor trip on turbine trip is an anticipatory trip input signal to the reactor protection system. This trip is anticipatory in that it is not assumed to occur in any of the Chapter 15 accident analysis. This trip meets all of the requirements of IEEE 279-1971 including separation, redundancy, single failure, and testability. Seismic

location, qualification, or mounting of the sensors is not practical because of their location in the nonseismic Turbine Building.

When the turbine is tripped, turbine auto stop oil pressure drops, and the pressure is sensed by three pressure sensors. A digital output is provided from each sensor when the oil pressure drops below a preset value. These three outputs are transmitted to two redundant two out of three logic matrixes, either of which trips the reactor if above P-9 setpoint.

The auto stop oil pressure signal also dumps the autostop emergency trip fluid, closing all of the turbine steam stop valves. When all stop valves are closed, a reactor trip signal will be initiated if the reactor is above P-9 setpoint. This trip signal is generated by redundant (two each) limit switches on the stop valves.

TVA has evaluated historical calibration data for the auto stop oil pressure sensors. This data indicates an unacceptable number of occurrences where the as-found instrument values were outside the allowable value limits. TVA has utilized the Corrective Action Program to investigate these occurrences and determine a resolution to minimize these events. It was determined that the allowable value for this function was too limiting for the accuracy and repeatability of the switches. TVA has performed calculations to determine an acceptable allowable value for this function. The proposed TS change reflects the value determined by the calculation process.

TVA has evaluated the allowable value requirements for this function in various other utilities TSs. This evaluation revealed many different requirements based on the type of instrumentation used to monitor the auto stop oil pressure. Since there were so many different values used, no specific correlation between the SQN values and the industry could be determined. For those utilities that had a setpoint of 45 psig, there were various allowable values associated with these TSs and the proposed SQN allowable value, while not identical to any other plant that we evaluated, is consistent. In general, the proposed allowable value is within the typical range of values seen in the industry in proportion to the setpoint.

#### 4.0 TECHNICAL ANALYSIS

TVA calculation IDQ00004720050001 R0 has been prepared to define an Allowable Value for the switch setpoint of 45 psig. The accuracy terms for switch Repeatability (Re), Drift (De), and Temperature Effects (TNe) defined within the calculation

are based on data supplied by the switch manufacturer. These terms are summarized as follows:

$$\begin{aligned} Re &= \pm 2.0 \text{ psig} \\ De &= \pm 2.0 \text{ psig} \\ TNe &= \pm 3.2 \text{ psig} \end{aligned}$$

Whereas, the switch setpoint As-left Calibration Tolerance (Ab), Input Calibration Test Equipment Accuracy (ICTe) and Reading Error (ICRe) allowances are:

$$\begin{aligned} Ab &= \pm 2.0 \text{ psig} \\ ICTe &= \pm 2.0 \text{ psig} \\ ICRe &= \pm 2.0 \text{ psig} \end{aligned}$$

Per TVA methodology, the minimum allowable value for this switch function is based on the following equation:

Allowable Value = Setpoint - Normal Measurable Accuracy (Anf)

The Setpoint is defined as 45 psig and Anf is defined with the following equation:

$$\begin{aligned} Anf &= \sqrt{Re^2 + De^2 + TNe^2 + ICTe^2 + ICRe^2 + Ab^2} \\ Anf &= \sqrt{2.0^2 + 2.0^2 + 3.2^2 + 2.0^2 + 2.0^2 + 2.0^2} \text{ psig} \\ Anf &= 5.5 \text{ psig} \end{aligned}$$

Therefore;

Allowable Value = Setpoint - Normal Measurable Accuracy (Anf)  
Allowable Value = 45 psig - 5.5 psig  
Allowable Value = 39.5 psig

Utilizing Westinghouse Methodology, the Allowable Value is based upon the following equation that involves the determination of a conservative "trigger value," the difference between the trip setpoint and the Allowable Value.

$$\text{Allowable Value} = \text{Setpoint} - \text{the lowest (most restrictive) of the "trigger values" of } T_1 \text{ or } T_2$$

Determination of  $T_1$  and  $T_2$ :

$$T_1 = RCA + RMTE + RCSA + RD$$

$$\begin{aligned}
\text{Where;} \quad \text{RCA} &= \text{Re} = 2.0 \text{ psi} \\
\text{RMTE} &= (\text{ICTe}^2 + \text{ICRe}^2)^{1/2} \\
&= (2.0^2 + 2.0^2)^{1/2} \\
&= 2.83 \text{ psi} \\
\text{RCSA} &= \text{Ab} = 2.0 \text{ psi} \\
\text{RD} &= \text{De} = 2.0 \text{ psi}
\end{aligned}$$

$$\begin{aligned}
T_1 &= 2.0 + 2.83 + 2.0 + 2.0 \text{ psi} \\
T_1 &= 8.83 \text{ psi}
\end{aligned}$$

The determination of  $T_2$  involves the evaluation of a trigger value based on a loop total allowance or limit. Since this switch trip function is anticipatory in that it is not assumed to occur in any of the Chapter 15 accident analysis, the determination of  $T_2$  is not applicable. Therefore, the Allowable Value is calculated based on using  $T_1$ .

$$\begin{aligned}
\text{Allowable Value} &= 45 - 8.83 \text{ psi} \\
&= 36.17 \text{ psig}
\end{aligned}$$

Based on the above, the more restrictive Allowable Value of 39.5 psig determined by using the TVA methodology will be used for conservatism.

Although the above Allowable Value determination does not involve an Analytical Limit, the methodology used complies with the intent of Method 1 defined within Section 7.3 of ISA-RP67.04.02. The allowance between the Allowable Value and the trip setpoint only accounts for drift, calibration uncertainties for the channel tested, and instrument uncertainties during normal operation that are measured during testing. This reactor trip is not directly credited in SQN's accident analysis and is maintained as an anticipatory trip to enhance the overall reliability of the reactor trip system. As such, there is not a specific safety limit associated with this function and the generation of a reactor trip based on low trip system pressure is above the required actuations to ensure acceptable mitigation of accidents.

## 5.0 REGULATORY SAFETY ANALYSIS

This letter is a request to amend Operating Licenses DPR-77 and DPR-79 for Sequoyah Nuclear Plant (SQN) Units 1 and 2. The proposed change would revise the allowable value for the low trip system pressure input to the reactor trip system that indicates a turbine trip condition. The present allowable value for this function is greater than or equal to 43 pounds per square inch (psig) and the proposed allowable

value is 39.5 psig. This proposed change will allow the instrumentation that performs this trip function to be tested and verified to be operable within the capabilities of the pressure switches. The current allowable value is not reasonable based on the design capabilities of the instrumentation.

#### 5.1 No Significant Hazards Consideration

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

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

Response: No.

The proposed change revises the allowable value for reactor trip as a result of a turbine trip on low trip system pressure. This change will not alter any plant components, systems, or processes and will only provide a more appropriate value to assess operability of the associated pressure switches. Since the plant features and operating practices are not altered, the possibility of an accident is not affected. This reactor trip is not directly credited in SQN's accident analysis and is maintained as an anticipatory trip to enhance the overall reliability of the reactor trip system. As such, there is not a specific safety limit associated with this function and the generation of a reactor trip based on low trip system pressure is above the required actuations to ensure acceptable mitigation of accidents. As the proposed change will continue to provide an acceptable anticipatory trip signal, the offsite dose potential is not affected by this change. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No.

As described above, this change will not alter any plant equipment or operating practices that have



the ability to create a new potential for accident generation. The proposed change revises the operability limits for a function that generates a trip signal when appropriate conditions exist to require accident mitigation response. This type of function does not have the ability to create an accident as its purpose and function is to mitigate events. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

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

Response: No.

The proposed change will revise an allowable value for a reactor trip initiator that results from a turbine trip condition. This change will not alter the setpoint, and the calibration of the associated pressure switches will continue to be set at the current values. The allowable value change is in response to accuracy aspects of the instrumentation and does not alter the ability of this trip function to operate when and as needed to mitigate accident conditions. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, TVA concludes that the proposed amendment(s) present no 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

Section 182a of the Atomic Energy Act requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The Commission's regulatory requirements related to the content of the TS are contained in Title 10, Code of Federal Regulations (10 CFR), Section 50.36. The TS requirements in 10 CFR 50.36 include the following categories: (1) safety limits, limiting safety systems settings and control settings, (2) limiting conditions for operation, (3) surveillance requirements (SRs), (4) design features, and (5) administrative controls. The requirements for the initiation of a reactor trip resulting from a turbine trip are included in the TS in accordance with 10 CFR 50.36(c) (2), "Limiting

Conditions for Operation."

As stated in 10 CFR 50.59(c)(1)(i), a licensee is required to submit a license amendment pursuant to 10 CFR 50.90 if a change to the TS is required. Furthermore, the requirements of 10 CFR 50.59 necessitate that U.S. Nuclear Regulatory Commission (NRC) approve the TS changes before the changes are implemented. TVA's submittal meets the requirements of 10 CFR 50.59(c)(1)(i) and 10 CFR 50.90.

NUREG-1431, Revision 3, "Standard Technical Specifications Westinghouse Plants," provides generic recommendations for requirements associated with the operation of Westinghouse Electric Company designed nuclear power plants. NUREG-1431 contains specifications for the generation of reactor trips as a result of a trip of the turbine. The proposed change supports these functions by implementing a more appropriate allowable value for this trip function. The proposed change is consistent with NUREG-1431 recommendations to the degree that the SQN design is compatible with these requirements.

General Design Criteria (GDC) 20 through 29, "Protection and Reactivity Control Systems," of Appendix A, "General Design Criteria," to 10 CFR Part 50, provides the expectations for protection systems associated with reactor operation. The proposed change does not alter the ability for the reactor trip functions to actuate on a valid turbine trip signal. The proposed allowable value is consistent with the SQN design and analysis and ensures proper actuation to satisfy the safety function. Therefore, the recommendations of these GDCs continue to be met with the proposed change.

There are several NRC regulatory guides associated with instrumentation and control systems for nuclear facilities. These guides deal primarily with the design, setpoint development, and testing of these systems. The proposed change does not alter these types of features for the reactor trip functions that are generated by turbine trip signals. The physical characteristics of these functions are not altered by the proposed allowable value and the setpoint will not be altered. Therefore, the recommendations of applicable regulatory guides continue to be met without change.

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 SR. 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)(9). Therefore, pursuant to 10 CFR 50.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

## 7.0 REFERENCES

1. Sequoyah Nuclear Plant, Final Safety Analysis Report (As Updated) Revision 18, Sections 7.2.1.1.2, 7.2.1.1.3, and 15.2.7, dated May 28, 2004
2. NUREG-1431, Revision 3, "Standard Technical Specifications Westinghouse Plants," dated March 2004

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY  
SEQUOYAH NUCLEAR PLANT (SQN)  
UNITS 1 AND 2

Proposed Technical Specification Changes (mark-up)

I. AFFECTED PAGE LIST

Unit 1

2-6a

Unit 2

2-7

II. MARKED PAGES

See attached.

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>
14. Deleted		
15. Undervoltage-Reactor Coolant Pumps	≥ 5022 volts-each bus	≥ 4739 volts-each bus
16. Underfrequency-Reactor Coolant Pumps	≥ 56.0 Hz - each bus	≥ 55.9 Hz - each bus
17. Turbine Trip		
A. Low Trip System Pressure	≥ 45 psig	≥ 43-psig 39.5
B. Turbine Stop Valve Closure	≥ 1% open	≥ 1% open
18. Safety Injection Input from ESF	Not Applicable	Not Applicable
19. Intermediate Range Neutron Flux - (P-6) Enable Block Source Range Reactor Trip	≥ 1 x 10 <sup>-5</sup> % of RATED THERMAL POWER	≥ 6 x 10 <sup>-6</sup> % of RATED THERMAL POWER
20. Power Range Neutron Flux (not P-10) Input to Low Power Reactor Trips Block P-7	≤ 10% of RATED THERMAL POWER	≤ 12.4% of RATED THERMAL POWER

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

<u>FUNCTIONAL UNIT</u>	<u>TRIP SETPOINT</u>	<u>ALLOWABLE VALUES</u>
b. RCS Loop $\Delta T$ Equivalent to Power > 50% RTP		
Coincident with Steam Generator Water Level--Low-Low(Adverse) and	$\geq 15.0\%$ of narrow range instrument span	$\geq 14.4\%$ of narrow range instrument span
Containment Pressure (EAM)	$\leq 0.5$ psig	$\leq 0.6$ psig
or		
Steam Generator Water Level--Low-Low (EAM)	$\geq 10.7\%$ of narrow range instrument span	$\geq 10.1\%$ of narrow range instrument span
14. Deleted		
15. Undervoltage-Reactor Coolant Pumps	$\geq 5022$ volts-each bus	$\geq 4739$ volts - each bus
16. Underfrequency-Reactor Coolant Pumps	$\geq 56$ Hz - each bus	$\geq 55.9$ Hz - each bus
17. Turbine Trip		
A. Low Trip System Pressure	$\geq 45$ psig	$\geq 43$ psig 39.5
B. Turbine Stop Valve Closure	$\geq 1\%$ open	$> 1\%$ open
18. Safety Injection Input from ESF	Not Applicable	Not Applicable