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

July 26, 2007

TVA-SQN-TS-07-01 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 07-01, RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION (RAI)

Reference: TVA letter to NRC dated February 26, 2007, "Sequoyah Nuclear Plant (SQN) - Units 1 and 2 - Technical Specification (TS) Change 07-01, 'Permanent Revision of Allowable Value for Reactor Trip System Turbine Trip on Low Trip System Pressure'"

This letter responds to the NRC's request for additional information associated with the TS change request in the referenced letter. The enclosure provides TVA's responses to NRC's request. There are no commitments contained in this letter.

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NRR

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

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 26th day of July, 2007.

Sincerely,

Glenn W. Morris

Glenn W. Morris
Manager, Site Licensing and
Industry Affairs

Enclosure
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ENCLOSURE

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

NRC Requested Information:

To support NRC assessment of the acceptability of the February 26, 2007, license amendment request (LAR) that proposes revising Technical Specification (TS) 2.2.1, Functional Unit 17.A, Table 2.2-1, "Reactor Trip System Instrumentation Trip Setpoints," please provide the following additional information:

1. *"Safety Limit (SL)-Related Determination: The LAR states that the turbine trip on low trip system pressure should not be considered an SL-related limiting safety system setting (LSSS) based, in part, on the Westinghouse evaluation supporting Revision 1 of Technical Specification Task Force (TSTF) traveler TSTF-493. However, subsequent to the submittal, the NRC staff rejected Revision 1 of TSTF-493. The LAR should be revised to provide justification for this trip function not being an SL-related LSSS that does not take credit for the TSTF."*

   Response:

   As stated in Final Safety Analysis Report Section 7.2.1.1.2, the involved switch trip function is anticipatory in that it is not assumed to occur in any of the Chapter 15 accident analysis. Additionally, the TS Bases identifies the functional capability of this design as an enhancement for the overall reliability of the Reactor Protection System. Therefore, no safety limit is specified for the switch function. The setpoint and the associated allowable value are not classified as a limiting safety system setting (LSSS) for a variable on which a safety limit has been placed as discussed in 10 CFR 50.36(c)(1)(ii)(A).

   Safety system settings that directly protect against violating the reactor core and reactor coolant system pressure boundary safety limits during anticipated operational occurrences are referred to as Safety Limit LSSS (SL-LSSS) Technical Specifications are required by 10 CFR 50.36 to contain SL-LSSS defined by the regulation as "...settings for automatic protective devices...so chosen that automatic protective action will correct the abnormal situation before a Safety Limit (SL) is exceeded." The Analytical Limit is the limit of the process variable at which a protective action is initiated, as established by the safety analysis, to ensure that a SL is not exceeded. Any automatic protection action that occurs on reaching the Analytical Limit therefore ensures that the SL is not exceeded.

Each of the analyzed accidents and transients can be detected by one or more reactor trip system (RTS) functions. The accident analysis takes credit for most RTS trip functions. RTS trip functions not specifically credited in the accident analysis may be qualitatively credited in the safety analysis and the NRC staff-approved licensing basis for the unit. However, qualitatively credited or backup functions are not SL-LSSS. These RTS trip functions may provide protection for conditions that do not require dynamic transient analysis to demonstrate function performance. They may also serve as backups to RTS trip functions that were credited in the accident analysis. The reactor trip for a turbine trip on low trip system pressure is one such trip function for the RTS. This trip is not credited in the accident analysis and it is not designed to correct an abnormal situation before a safety limit is exceeded. This trip is an anticipatory trip for other RTS functions to enhance the overall reliability. Therefore, this reactor trip for a turbine trip on low trip system pressure is not a SL-LSSS.

2. *"The below listed references provide staff guidance regarding testing of LSSS instrument channels. In accordance with this guidance, provide the following information regarding the turbine trip on low trip system pressure:*

   a. *Setpoint Calculation Methodology: Provide documentation (including sample calculations) of the methodology used for establishing the limiting acceptable value for the As-Found setpoint as measured in periodic surveillance testing. Indicate the related Analytical Limits and other limiting design values (and the sources of these values).*

   b. *As-Found setpoint evaluation: Describe how surveillance test results and associated limits are used to establish operability of the system. Show that this evaluation is consistent with the assumptions and results of the setpoint calculation methodology. Discuss the plant corrective action processes (including plant procedures) for restoring channels to operable status when channels are determined to be 'inoperable' or 'operable but degraded.'"*

REFERENCES:

1. NRC Regulatory Issue Summary 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, "Technical Positions," Regarding Limiting Safety System Settings During Periodic Testing and Calibration of Instrument Channels," dated August 24, 2006. This document is available on the NRC public website in the Agency Documents Access and Management System (ADAMS), Accession No. ML051810077.

2. Letter from Patrick L. Hiland, NRC, to NEI Setpoint Methods Task Force, "Technical Specification for Addressing Issues Related to Setpoint Allowable Values," dated September 7, 2005, ADAMS Accession No. ML052500004.

3. Letter from Bruce A. Boger, NRC, to Alexander Marion, "Instrumentation, Systems, and Automatic Society (ISA) S67.04 Methods for Determining Trip Setpoints and Allowable Values for Safety-Related Instrumentation," dated August 23, 2005, ADAMS Accession No. ML051660447.

4. Letter from James A. Lyons, NRC, to Alex Marion, Nuclear Energy Institute (NEI), "Instrumentation, Systems, and Automation Society S67.04 Methods for Determining Trip Setpoints and Allowable Values for Safety-Related Instrumentation," dated March 31, 2005, ADAMS Accession No. ML050870008.

Response:

As stated in the response to Question 1, the reactor trip for a turbine trip on low trip system pressure is not classified as a LSSS for a variable on which a safety limit has been placed as discussed in 10 CFR 50.36(c)(1)(ii)(A). The following responses are provided to the extent possible for a function that is not a SL-LSSS.

2.a

TVA calculation IDQ00004720050001 R0, "Instrumentation Accuracy Calculation" 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:

Re = ± 2.0 psig
De = ± 2.0 psig
TNe = ± 3.2 psig

Whereas, the switch setpoint as-left calibration tolerance (Ab), input calibration test equipment accuracy (ICTe), and reading error (ICRe) allowances are:

Ab = ± 2.0 psig
ICTe = ± 2.0 psig
ICRe = ± 2.0 psig

2.a (continued)

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

Allowable Value = Setpoint - Normal Measurable Accuracy (Anf)

Note: The acceptable as-found setpoint tolerance is the same as the Normal Measurable Accuracy (Anf).

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

$$Anf = \pm\sqrt{Re^2 + De^2 + TNe^2 + ICTe^2 + ICRe^2 + Ab^2} \text{ psig}$$

$$Anf = \pm\sqrt{2.0^2 + 2.0^2 + 3.2^2 + 2.0^2 + 2.0^2 + 2.0^2} \text{ psig}$$

$$Anf = \pm 5.5 \text{ psig}$$

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.

Allowable Value = Setpoint - the lowest (most restrictive) of the "trigger values" T_1 or T_2

Determination of T_1 and T_2:

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

Where;
RCA = Re = 2.0 psi
$RMTE = (ICTe^2 + ICRe^2)^{1/2}$
$= (2.0^2 + 2.0^2)^{1/2}$
= 2.83 psi
RCSA = Ab = 2.0 psi
RD = De = 2.0 psi

$T_1 = 2.0 + 2.83 + 2.0 + 2.0$ psi
$T_1 = 8.83$ psi

2.a (continued)

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.

$$\text{Allowable Value} = 45 - 8.83 \text{ psi}$$
$$= 36.17 \text{ psig}$$

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, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation." 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.

2.b

Engineering design output Setpoint and Scaling Documents (SSDs) specify the as-found tolerance for the trip setting as evaluated within TVA calculation IDQ00004720050001 R0. Periodic plant surveillance instructions incorporate the as-found tolerance values ensuring compliance with the design basis requirements defined within the SSDs. The channel functional test requirement for the involved loops is defined within TS Table 4.3-1 as prior to each reactor startup unless performed within the previous 31 days. The plant surveillance requires the setpoint to be returned to within the specified acceptable as-left calibration tolerance if found outside this allowance during performance of the channel functional test. If the setpoint is found outside the as-found tolerance allowance (i.e., Technical Specification Allowable Value exceeded), the plant surveillance requires an evaluation be performed per the requirements of the corrective action program.