NRR-PMDAPEm Resource

From:	Schaaf, Robert
Sent:	Friday, August 11, 2017 2:37 PM
To:	Wells, Russell Douglas
Cc:	Hulvey, Kimberly Dawn; Schrull, Edward Dustin (edschrull@tva.gov); Wheeler, Larry; West, Khadijah; Chernoff, Margaret; Singh, Gursharan; Shoop, Undine; Saba, Farideh
Subject:	Watts Bar, Unit 1 - Final Request for Additional Information Concerning Request to Amend Turbine Trip Low Fluid Oil Pressure Reactor Protection System Trip Setpoint (CAC No. MF9401)
Attachments:	MF9401 Final RAIs.pdf

On August 8, 2017, the U.S. Nuclear Regulatory Commission (NRC) staff sent the Tennessee Valley Authority draft Requests for Additional Information (RAIs) via e-mail. These RAIs relate to TVA's license amendment request (LAR) dated March 16, 2017 (ADAMS Accession No. ML17075A229), that would revise the turbine trip low fluid oil pressure reactor protection system (RPS) trip setpoint in the Watts Bar Nuclear Plant, Unit 1, Technical Specifications.

An RAI clarification call was held on August 10, 2017. The final RAIs, unmodified from the August 2, 2017, draft, are attached to this e-mail.

During the August 10, 2017, clarification call the licensee agreed to provide a response to the final RAIs within 30 days of transmittal of the final RAIs, which is September 11, 2017.

If you have any questions, please contact me at 301-415-6020 or Robert.Schaaf@nrc.gov.

Regards,

Robert G. Schaaf

Robert G. Schaaf
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REQUEST FOR ADDITIONAL INFORMATION

REGARDING LICENSE AMENDMENT REQUEST TO CHANGE

TS TABLE 3.3.1-1 REACTOR TRIP SYSTEM INSTRUMENTATION

TURBINE TRIP FUNCTION ON LOW FLUID OIL PRESSURE

WATTS BAR NUCLEAR PLANT, UNIT 1

DOCKET NO. 50-390

By letter dated March 16, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML17075A229), Tennessee Valley Authority (TVA, or the licensee), proposed changes to the Technical Specifications (TSs) for Watts Bar Nuclear Plant (Watts Bar), Unit 1. The proposed changes will revise Watts Bar TS Table 3.3.1-1, "Reactor Trip System Instrumentation," to reflect plant modifications to the reactor protection system instrumentation associated with turbine trip on low fluid oil pressure. The proposed changes are due to the replacement and relocation of the pressure switches from the low pressure auto-stop trip fluid oil header that operates at a nominal control pressure of 80 pounds per square inch gauge (psig) to the high pressure turbine electrohydraulic control (EHC) oil header that operates at a nominal control pressure of 2000 psig. The licensee stated that the changes to the nominal trip setpoint (NTSP) and allowable value are needed due to the higher EHC system operating pressure. The proposed change also adds new footnotes (g) and (h) to the turbine trip on low fluid oil pressure trip setpoints to assess channel performance during testing that verifies instrument channel setting values established by TVA's setpoint methodology.

The U.S. Nuclear Regulatory Commission (NRC) staff has determined that additional information, as described in the requests for additional information (RAIs) below, is required for the staff to complete its review of the application.

Regulatory Bases

Title 10 of the Code of Federal Regulations (10 CFR), Paragraph 50.36(c)(3) states that Surveillance Requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

10 CFR Part 50, Appendix A:

> Criterion 20 - Protection System Functions
>
> The protection system shall be designed (1) to initiate automatically the operation of appropriate systems including the reactivity control systems, to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences and (2) to sense accident conditions and to initiate the operation of systems and components important to safety.

Criterion 22 - Protection System Independence

The protection system shall be designed to assure that the effects of natural phenomena, and of normal operating, maintenance, testing, and postulated accident conditions on redundant channels do not result in loss of the protection function, or shall be demonstrated to be acceptable on some other defined basis. Design techniques, such as functional diversity or diversity in component design and principles of operation, shall be used to the extent practical to prevent loss of the protection function.

Criterion 23—Protection System Failure Modes

The protection system shall be designed to fail into a safe state or into a state demonstrated to be acceptable on some other defined basis if conditions such as disconnection of the system, loss of energy (e.g., electric power, instrument air), or postulated adverse environments (e.g., extreme heat or cold, fire, pressure, steam, water, and radiation) are experienced.

10CFR50.65: Maintenance Rule

(a)(1) Each holder of an operating license for a nuclear power plant under this part and each holder of a combined license under part 52 of this chapter after the Commission makes the finding under § 52.103(g) of this chapter, shall monitor the performance or condition of structures, systems, or components, against licensee-established goals, in a manner sufficient to provide reasonable assurance that these structures, systems, and components, as defined in paragraph (b) of this section, are capable of fulfilling their intended functions. These goals shall be established commensurate with safety and, where practical, take into account industrywide operating experience. When the performance or condition of a structure, system, or component does not meet established goals, appropriate corrective action shall be taken.

NUREG-0800 (Standard Review Plan) Branch Technical Position 7-12 describes the information to be submitted for review of a licensee's instrument setpoints, including:

- A description of the setpoint methodology and procedures used in determining setpoints, including information sources, scope, assumptions, interface reviews, and statistical methods.
- The basis for acceptable as-found band and acceptable as-left band and determination of the instrument operability based on the acceptable as-found band and acceptable as-left band.
- The basis for assumptions regarding instrument uncertainties and a discussion of the method used to determine uncertainty values.

<u>Background</u>

The licensee proposed to replace and relocate the pressure switches from the low pressure auto-stop trip fluid oil header that operates at a nominal control pressure of 80 pounds per square inch gauge (psig) to the high pressure turbine electrohydraulic control (EHC) oil header that operates at a nominal control pressure of 2000 psig. The changes to the nominal trip setpoint (NTSP) and allowable value are needed due to the higher EHC system operating pressure. Relocation of the initiating pressure switches to the high pressure turbine EHC header is needed to accommodate a modification to the EHC turbine control system while

maintaining the function of transmitting the trip signal to the reactor protection system (RPS). This change does not affect any RPS trip functions.

The existing turbine protection system consists of the low pressure auto-stop oil system, and the stop valve and control valve emergency trip fluid systems in the high-pressure EHC fluid control system. On a turbine trip signal, solenoid valves open to depressurize the auto-stop oil system, which causes an interface emergency trip valve to open, depressurizing the high pressure EHC header. Loss of the EHC pressure causes the stop valve emergency trip fluid systems to trip closed, tripping the turbine. When the low oil pressure condition is sensed below the setpoint following a turbine trip by two-out-of-three pressure switches RPS Channel I, II, and III, the RPS initiates a reactor trip signal.

The new configuration will allow the RPS trip function to be performed by three new pressure switches in a different location but with the same function. The new pressure switches are located on the high pressure turbine EHC trip header. Consistent with the original pressure switches, the three new pressure switches have two output contacts that provide redundant inputs to each of the three RPS protection channels I, II and III (two-out-of-three logic). The RPS logic is not affected by the change and the signal will still initiate a reactor trip on a turbine trip if reactor power is above the P-9 power range neutron flux interlock (approximately 50% of full power).

TVA has evaluated and confirmed, as described in section 3.2.1 of the LAR, that the Watts Bar allowable value of 710 psig was sufficient to account for uncertainties for the pressure switches being used at Watts Bar in accordance with TVA Branch Technical Instruction BTI-EEB-TI-28, “Setpoint Calculations.” BTI-EEB-TI-28 incorporates methodologies for the determination of setpoints for nuclear safety-related instrumentation in ISA Standard ISA-S67.04-1982 and 1994, “Setpoints for Nuclear Safety-Related Instrumentation Used in Nuclear Power Plants,” as endorsed in Regulatory Guide (RG) 1.105, Revisions 2 and 3, respectively. Although the pressure switches are considered non-safety related, the new turbine trip setpoint on low fluid oil pressure has been determined in accordance with BTI-EEB-TI-28. Instrument uncertainties such as calibration error, and drift were considered in determining a total device uncertainty for the pressure switches.

<u>Request for Additional Information</u>

RAI-SBPB-1:

Describe if the existing turbine trip system (as described above) and as it related to the proposed changes to TS 3.3.1-1 Tables, is within the scope of Maintenance Rule and described if the proposed turbine trip system is within the scope of Maintenance Rule.

RAI-SBPB-2:

Confirm whether there is a difference in the time interval from depressurization to trip logic initiation between the current auto-stop oil system configuration and the proposed high pressure turbine EHC oil system configuration. Provide technical justification for any change in the time interval.

RAI-SBPB-3:

Describe the electrical power design to the new pressure switches and describe given a loss of power to these new pressure switches if the low fluid oil pressure logic would fail in a safe position.

RAI-EICB-1:

The licensee proposed to increase the allowable value from 43 psig to 710 psig for turbine trip on low fuel oil pressure. On page E1-9 of 16 of the license amendment request, the licensee stated that, “The allowable value is derived from the NTSP in accordance with BTI-EEB-TI-28.” Provide technical justification in the form of a calculation summary for the BTI-EEB-TI-28 methodology detailing how the 710 psig value was established. The calculation summary should include, but not be limited to, total loop uncertainty (TLU), as-left tolerance (ALT), as-found tolerance (AFT), basis for selection, and limitations pertaining to the proposed NTSP of 800 psig.