

June 14, 1993

Tennessee Valley Authority
ATTN: Dr. Mark O. Medford, Vice President
Technical Support
3B Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dear Dr. Medford:

SUBJECT: WATTS BAR UNIT 1 - USE OF EAGLE-21 DIGITAL PROTECTION SYSTEM
(TAC M81063)

By letters dated July 10, 1991, February 26, October 26 and November 5, 1992, TVA submitted design information on the Eagle-21 system for Watts Bar Unit 1 reactor protection system. Based on the review of the information above, the staff identified several hardware and software issues that need additional clarification as delineated in the enclosed request for additional information (RAI).

If you need clarification on this RAI, the staff will be available for a conference call. We will discuss with your staff, in the next licensing status meeting, an acceptable target date for your response. This requirement affects nine or fewer respondents and, therefore, is not subject to Office of Management and Budget review under P. L. 96-511.

Sincerely,

Original signed by P. S. Tam for

Peter S. Tam, Senior Project Manager
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Request for Additional Information

cc w/enclosure:
See next page

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RFOL 1/1

Watts Bar Nuclear Plant

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REQUEST FOR ADDITIONAL INFORMATION
WATTS BAR UNIT 1
USE OF EAGLE-21 DIGITAL PROTECTION SYSTEM

1. EMI/RFI

- Provide the methodologies and the results of the EMI/RFI site survey for the pre-installed and installed environment. If pre-installed site survey is not performed, provide justification for not performing the pre-installed survey.
- Provide a summary of TVA's comparison between the on-site and factory EMI/RFI test results. Does Eagle-21 equipment have a sufficient margin? Explain.
- Provide the list of equipment used to perform the site survey. Are they adequate for performing EMI/RFI test and survey required by the Eagle-21 system? Explain in detail.
- Explain how the WBN Eagle-21 system prevents a ground loop. Is the Eagle-21 system to be tested for ground loops after installation? If so, by what procedures?

2. ESD

- Explain how WBN is planning to reduce ESD occurrence.

3. 1E/Non-1E Isolation

- Explain how the 1E equipment communicates with the Non-1E equipment at WBN. Also, describe how the non-1E system will not prohibit the 1E equipment from performing its intended safety functions. In addition, explain how the 1E equipment is isolated and how isolation devices meet the requirements of Regulatory Guide 1.75 and other applicable IEEE standards.

4. Software

- How long can the WBN Eagle-21 reactor coolant system overpower and over temperature protection resistance temperature detectors (RTD) be removed from scan and entered into the newly added disable "D" state, and how many RTDs can be removed from the scan and entered into this state? Can failed RTDs be removed from scan and entered into the "D" state? If so, explain why this would not reduce the reliability of the system.
- Explain how the threshold settings for the steam flow and feed flow are added to the WBN Eagle-21 system. This should include the threshold setting analysis report if there is any.

- Are all the hardware and software modifications for WBN complete? If not, provide: (1) the descriptions of the modifications that have not been finalized and (2) the completion schedule.
- Provide scaling and setpoint documents for WBN.
- Explain how the WBN Eagle-21 main program and supporting software is tested. Is the entire Eagle-21 software retested to ensure that the modified software section would not cause any problems elsewhere? If all the Eagle-21 software is not retested, provide the justifications for not retesting the entire Eagle-21 software.
- Is each of the WBN Eagle-21 software modification requirements covered by at least one test case? Explain how the modified Eagle-21 software meets the: (1) performance requirements, (2) external interface requirements, and (3) man-machine and system control requirements. In addition, describe the acceptance criteria and provide the summary of the test results.
- Provide a summary of the: (1) V&V process and (2) software configuration management for the modified WBN Eagle-21 system. The summary should also include the revised V&V report (WCAP-13191, Rev. 2) and TVA's evaluation of Westinghouse's V&V process and problem reports.
- Explain the software error reporting procedures. Explain how software errors are reported to the NRC.

5. Defense Against Failures

- Explain how the WBN Eagle-21 system defends against common mode failures. The explanation should include the applicant's evaluation on defense-in-depth analysis and functional diversity. Does WBN use Westinghouse's Eagle-21 family product line in the ATWS mitigation system actuation circuitry?

6. Hardware

- Discuss the hardware changes incorporated in the Eagle-21 hardware for WBN to increase its capabilities as compared to Sequoyah's Eagle-21 system to process additional type of sensors that uses gain and offset adjustment coefficients. The discussion should also explain: (1) what hardware is changed, and (2) what tests are performed? Finally, provide the results of the tests.
- How is information on Eagle-21 system failures (chip problems or failures specific to the Eagle-21 system) and their corrective actions communicated between Westinghouse and WBN?

7. System

- Do the Eagle-21 design changes impact WBN's commitments to meet RG 1.97, "Instrumentation for Light-Water-Cooled Nuclear Power Plant to Assess Plant and Environments Conditions During and Following an Accident"?

8. Power

- Describe the power source for the WBN Eagle-21 racks. Does this power system have sufficient capability to power all the Eagle-21 racks? How much margin does the power source have?