



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

November 21, 1994

MEMORANDUM FOR: Docket File

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

A handwritten signature in black ink that reads "Peter S. Tam".

SUBJECT: WATTS BAR NUCLEAR PLANT - MATERIAL TO BE USED IN UPCOMING  
CONFERENCE CALLS (M81063)

The attached comments were faxed to TVA today to prepare its site personnel for an upcoming conference call. The comments do not constitute a formal request for additional information, nor formal staff position; they only constitute agenda for the conference call.

Docket Numbers 50-390  
50-391

Enclosure: As stated.

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## ISSUES FOR DISCUSSION: EAGLE-21

The staff would like to discuss with TVA certain EMI/RFI issues in TVA's report "Analysis for EMI/RFI Mapping of Auxiliary Electric Equipment Room for Tennessee Valley Authority's Watts Bar Nuclear Plant Unit 1," which was enclosed in TVA's letter dated August 12, 1994.

1. Describe the configuration differences between the Eagle-21 system that was tested in the lab and the system that was installed in WBN. If there are any differences, explain why the differences in the configuration would not affect the conclusion derived from the test.
2. Provide a discussion on the amount of error that could be introduced during the survey and the susceptibility tests.
3. Page 2 of TVA's report states that the noise level 129.54 dBuV/m (3 V/m) emitted to the Eagle-21 system at various frequencies caused trip output failure at five frequencies ranging between 160 Mhz to 200 Mhz. Explain at what noise level trip output failure starts to occur. Does the system start to fail at those five frequencies when the noise level is 126 dBuV/m, 120 dBuV/m, or some other lower level?
4. What are the Eagle-21 system's worst-case expected susceptibility levels and calculated threshold levels? Is the Eagle-21 system tested to these susceptible levels and calculated levels? If not, explain how these levels are derived and calculated, and explain why the Eagle 21 system is qualified to the susceptibility and calculated threshold levels.
5. Page 12 of TVA's report states that the expected susceptibility points were determined by assuming that the equipment configuration was different from the installed Eagle-21 system. Describe all the differences between the configuration assumed to determine the worst-case expected susceptibility levels. In addition, explain why the differences in the configurations would not affect the determination of the worst-case susceptibility levels.
6. Page 12 of TVA's report states that the filters are installed on the affected board with a 3dB point at 0.5 hz. If we assume the filter is a simple single-pole filter, the filter would attenuate the noise on the board by 20 dB per decade. Thus, the noise at 1.8 Mhz is attenuated by 131 dB. With 131 dB attenuation, the noise at frequency 1.8 Mhz should be negligible; however, site survey measured 152 dBuA at 1.8 Mhz. This means that there is a noise source that emits 283 dBuA in the Auxiliary Electric Equipment Room. Is this true? In addition, explain how the extra 1 dBuA can be obtained from design factors described on Page 12.

7. Page 14 of TVA's report states that the measurements taken at WBN for Test CE07, which is a transient tests, were done without switching output or switching devices that share the instrumentation bus lines. Explain why output or switching devices that share the instrumentation bus lines were not switched during the measurement. At normal operation, would those switching output or switching devices switch while the Eagle-21 system is operating? In addition, explain how the measured data are adjusted for switching conditions.
8. Pages 17 and 18 of TVA's report states that the RE02 test included measuring the field strength in the room while keying a HT-1000 portable radio at 172.1 Mhz from 1 meter from the stairway with the room door closed. The field measured in the room was 117 dBuV/m, which is 13 dB below the actual detected field strength. Is it possible to have a situation where a person uses the portable radio while someone else enters or exits from the room? If possibility exists, explain why the test was performed with the door to the room door closed and explain the steps that are being taken by TVA to prevent the door from being opened during portable radio use. If that situation would not arise, explain why. In addition, explain why using the HT-100 portable radio adjacent to the door to the auxiliary electric equipment room would radiate field strength sufficiently high enough to cause failures.
9. Provide STC Report 92-1SVO-EMIRFI-R1 and its summary.
10. Section 10 of TVA's report only showed the mapping of the fields measured by following CE01 and CE03 survey methods to the threshold susceptibility level. Provide the same kind of mapping for the measured field data in Sections 6, 7, 8, and 9 of the EMI/RFI analysis report.
11. Explain why Figure 6 of TVA's report is not reflected in the figures in Section 10.
12. Describe the differences between Eagle-21 system configuration used in STC Report 92-1SVO-EMIRFI-R1 and the Eagle-21 system installed in WBN. If there are any differences, explain why the differences in the configuration would not affect the test results. In addition, explain how the worst-case conditions are assumed for the study. Explain why the study configuration and conditions are the worst case conditions. Also, explain in detail why the Eagle-21 system is not susceptible to the noise between 0 to 30 hz.