Mr. Oliver D. Kingsley, Jr.
President, TVA Nuclear and
Chief Nuclear Officer
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

January 23, 1997

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING REQUEST FOR LICENSE AMENDMENT TO TECHNICAL SPECIFICATIONS - SPENT FUEL POOL STORAGE CAPACITY INCREASE - WATTS BAR UNIT 1 (TAC NO. M96930)

Dear Mr. Kingsley:

On October 23, 1996, the Tennessee Valley Authority submitted a request for a license amendment to the technical specifications regarding the spent fuel pool storage capacity. The NRC staff has performed a preliminary review of the submittal and has determined that additional information is needed for our review. Accordingly, we request that you provide responses to the issues identified in the enclosure so that we may continue our review of your submittal.

Sincerely,

Original signed by

Robert E. Martin, Senior Project Manager
Project Directorate II-3
Division of Reactor Projects I/II
Office of Nuclear Reactor Regulation

Docket No. 50-390

Enclosure: Additional Information

cc w/enclosure: See next page

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Mr. Oliver D. Kingsley, Jr.
Tennessee Valley Authority

WATTS BAR NUCLEAR PLANT

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REQUEST FOR ADDITIONAL INFORMATION

WATTS BAR NUCLEAR PLANT

SPENT FUEL POOL STORAGE CAPACITY

1. With respect to the dynamic fluid-structure interaction analyses using the computer code, DYNARACK, in Reference 1, provide the following:

   a) Explain how the simple stick model used in the dynamic analyses can represent accurately and realistically the actual highly complicated nonlinear hydrodynamic fluid-rack structure interactions and behavior of the fuel assemblies and the box-type rack structures. Discuss whether or not a finite element (FE) model with 3-D plate, beam and fluid elements together with appropriate constitutive relationships would be a more realistic, accurate approach to analyze the fluid-structure interactions in contrast to the stick model.

   b) Provide the results of any existing experimental study that verifies the correct or adequate simulation of the fluid coupling utilized in the numerical analyses for the fuel assemblies, racks and walls. If there is no such experimental study available, provide justification that the current level of the DYNARACK code verification is adequate for engineering application and should be accepted without further experimental verification work.

2. A comprehensive analysis of the results were not provided in the submittal (Reference 1) for staff review. Provide a summary of the analysis results (i.e., stresses, displacements, hydrodynamic pressure distribution, locations of the maximum responses, etc.) in a tabular form for the single- and multi-rack analyses.

3. Explain how the dampings were considered in the DYNARACK and ANSYS numerical simulations. Were they constant for all frequencies or frequency dependent?

4. With respect to the accidental rack-drop analysis in Reference 1, provide the following:

   a) analytical approaches or methodologies used,
   b) loading conditions,
   c) failure (tear and rupture) criteria,
   d) material properties used including concrete bearing strength and the friction between the pedestal and liner, and
   e) complete summary of the analytical results in a tabular form.

5. It appears that Figures 6.4.3-6.4.5 of Reference 1 do not contain correct units for the acceleration of the time histories. Please review them and submit a revised set of time histories.

ENCLOSURE

6. Tennessee Valley Authority (TVA) is planning to install the storage racks that were manufactured by Programmed and Remote System Corporation (PaR) and used at the TVA's Sequoyah Nuclear Power Plant (SQN) for about 13 years. Discuss the quality assurance and inspection programs to confirm the structural integrity of the racks (i.e., material strength and property changes, corrosions and material creep/hardening due to thermal loadings and radiations, etc.). Submit a summary report of the structural degradations that deviate from the licensed structural conditions of the SQN if there are any.

7. Discuss the quality assurance and inspection programs to preclude installation of any irregular or distorted rack structure, and to confirm the actual fuel rack gap configurations with respect to the gaps assumed in the DYNARACK analyses after installation of the racks.

8. Provide the locations of the leak chase systems with respect to the locations of the racks and pedestals.

9. Describe how the liner plates are attached to the channels embedded in the concrete slab.

10. Describe the method of leak detection in the fuel pool structure. How are leaks monitored? Is there any existing leakage?

11. Indicate whether or not TVA is planning to place an overhead platform on the racks permanently or as temporary storage during the installation of the racks.

12. Describe the plan and procedure for the post OBE inspection of fuel racks gap configurations.

Reference:

"Watts Bar Nuclear Plant Unit 1 - Request for License Amendment to Technical Specification - Spent Fuel Pool Storage Capacity Increase," Letter dated October 23, 1996 from TVA to U.S. NRC.