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Docket Nos.: 50-390/391

Mr. H. G. Parris
Manager of Power
Tennessee Valley Authority
500 A Chestnut Street, Tower II
Chattanooga, Tennessee 37401

RECEIVED DEC 14 1981 U.S. NUCLEAR REGULATORY COMMISSION

Dear Mr. Parris:

Subject: Request for Additional Information Concerning the Watts Bar Nuclear Plant, Units 1 and 2

Attached are requests for additional information developed as a result of our review of the Final Safety Analysis Report for the Watts Bar Nuclear Plant, Units 1 and 2. To expedite the review of your facility, these items were forwarded to your staff informally in late November 1981.

Below is a list of the subject areas included in this package:

Attachment	Q Nos.	Subject
1	371.29-371.33	Hydrologic Engineering
2	131.52	Masonry Walls

As discussed with your staff, we expect your response to the questions on masonry walls to be included in your January 1982 submittal. The concerns regarding hydrologic engineering may appear in the SER as open items unless they can be answered satisfactorily by your staff prior to December 31, 1981.

If you have any questions concerning these matters, please contact the project manager, T. J. Kenyon at 301/492-7266.

The reporting and/or recordkeeping requirements contained in this letter affect fewer than ten respondents, therefore, OMB clearance is not required under P.L. 96-511.

Sincerely,

/S/

Elinor G. Adensam, Chief
Licensing Branch No. 4
Division of Licensing

Enclosures:
As Stated
cc: See attached list

OFFICE		DL:LB #4	LA:DL:LB #4	DL:LB #4			
SURNAME		TJKenyon/tmc	MDuncan	EAdensam			
DATE		12/4/81	12/3/81	12/4/81			

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WATTS BAR

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Resident Inspector/Watts Bar NPS
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Commission
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Mr. David Ormsby
Tennessee Valley Authority
400 Chestnut Street, Tower II
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Attachment 1
Hydrologic Engineering Questions
Watts Bar Open Items

371.29 Local Site Drainage (PMP)

References: Previous Question Numbers 371.1, 371.18, 371.19 and 371.20.

The staff has many problems with regard to performing an adequate review of the provisions for site drainage at the Watts Bar site. The biggest obstacle is the poor quality of material that we have to work with. Namely the topographic maps are too small a scale and difficult to read, much of the data is provided on mapping rather than in tabular form and some data has not been provided at all. The following is a list of information that we will require to complete our review.

1. Provide full size (unreduced) drawings that show the final grading plans and site drainage features. As a minimum these should show the outline of drainage sub-areas with the drainage areas and peak discharges, the direction of flow for runoff, change of grade elevations for all roads and railroads, culvert locations, ponding areas (areal extent), building outlines and plant grade elevations adjacent to safety related buildings.

2. Where credit is taken for flow-through catch basins or culverts, provide pertinent details of the structure; i.e., size, shape, inlet and outlet invert elevations, roughness, erosion protection, and assumed coefficients. In addition, where these facilities are exposed to heavy loads, you should show that they won't fail under maximum

loading conditions (state conditions) or show that their failure won't increase your maximum predicted water level. Provide a discussion on the assumptions on potential debris blockage of these structures. A tabular listing, of pertinent data requested above, would be appreciated.

3. Where weir flow is used as the basis for a maximum water level, provide the weir length, width and coefficient. Consider the effects of downstream submergence.

4. Where credit is taken for storage, provide area-capacity curves for the storage area and the time increment used for routing.

The table presented in section 2.4.1.1 lists several exterior accesses that are below elevation 729.0 feet msl. Explain how runoff water is precluded from entering these openings during maximum local site flooding events. If flooddoors are used, explain procedures for insuring doors are closed during flood event.

371.30A You have not provided any information on the ponding of Probable Maximum Precipitation (PMP) on the roofs of safety-related buildings nor the ability of roofs to withstand the PMP loading. This information is necessary to allow the NRC staff to verify that the roofs of safety-related structures can withstand the stresses resulting from Probable Maximum Precipitation (PMP) and other normal loads that are combined with PMP. Past practice indicates that the applicant generally has two choices as follows:

1. Where the structural distress level (safety related roofs), in terms of ponded rainfall depth combined with other normal coincident loads, exceeds the height of the parapet walls, it is acceptable to provide the structural distress level and indicate that since this level exceeds the height of parapet walls, PMP is not the controlling design basis event.

2. Where the structural distress level (as previously defined) for the roof of a safety-related building is below the level of the parapet wall, then the applicant must provide sufficient data for the NRC staff to independently determine the maximum depth of ponded water (PMP) and the resulting roof load. The minimum data required is:

   a. Area of confined roof.

   b. If credit is taken for roof drains provide details of drains and justification for percent blockage assumed. Consider ice and other possible debris.

   c. Elevation of roof and parapet wall.

   d. Number, size and elevation of scuppers.

   e. Probable Maximum Precipitation rate and bases.

   f. Where the above information is provided on drawings, they should be unreduced; reduced drawings are generally not legible.

371.30B It appears that PMP will be the controlling precipitation load on roofs of safety related buildings, however you should also consider the following:

1. An extreme environmental load to be considered in the design of safety-related structures is the maximum weight of precipitation that can accumulate on roofs due to a combination of snow, ice, and rain. A maximum weight of snowfall of 31 psf is suggested in Section 2.3.1.2 of the FSAR as the extreme environmental load. However, a combination of snow, ice, and rain (a likely wintertime mixture of precipitation) may result in a load of more than 31 psf on the roofs of safety-related structures.

2. Provide an estimate of the maximum weight of precipitation that can accumulate on the roofs of safety-related structures due to a combination of snow, ice, and rain (see SRP 2.3.1). Provide an estimate of the probability of this load, and compare this probability with that used to determine other extreme environmental loads used in the design of safety-related structures. An acceptable method for conservatively estimating this load is to add the weight of the 100-year snowpack (14 PSF according to Section 2.3.1.3) to the weight of the 48-hour probable maximum winter precipitation (not necessarily as all snowfall). The slopes of roofs, the heights of parapets (if any) and the locations of drains and scuppers should be considered in estimating the maximum weight of precipitation that can accumulate on roofs of safety-related structures.

371.31 The Watts Bar intake canal may be susceptible to sediment accumulation during normal operation and especially during flood or high water conditions on the Tennessee River. Accumulations of sediment in the intake canal could conceivably block the canal and/or safety related pumps with subsequent loss of the safety related water supply.

Provide estimates of sediment accumulation rates (or depths of sediment) in the intake canal for both normal and flood conditions on the Tennessee River. Based on the above estimates, provide the details of an inspection, monitoring and maintenance program in accordance with the criteria suggested in Regulatory Guide 1.127, "Inspection of Water Control Structure Associated with Nuclear Power Plants."

371.32 It is our position that you are using a permanent dewatering system for safety related purposes. We require that you comply with the criteria specified in Branch Technical Position HMB/GSB-1, "Safety Related Permanent Dewatering Systems," which is attached to Standard Review Plan 2.4.13. We suggest a meeting with the NRC staff for the purpose of describing your dewatering system and to review staff requirements on data and system analyses.

371.33 Provide the draft technical specification for the Flood Protection Plan for the Watts Bar Plant. Provide the Limiting Conditions for Operation, Surveillance Requirements and Bases.

ATTACHMENT-2

REQUEST FOR ADDITIONAL INFORMATION

131.52 The Structural Engineering Branch has reviewed the following reference letters which transmitted TVA's partial response to the NRC Informational Request regarding Category I masonry walls:

References:
1. Letter from L.M. Mills to A. Schwencer dated February 12, 1981.
2. Letter from L.M. Mills to E. Adensam dated August 20, 1981.
3. Letter from L.M. Mills to E. Adensam dated September 14, 1981

In order to complete our review, the following information is requested:

1) In reference 1, the response to Question 2 indicated that load combinations for dead plus live, dead plus live plus OBE, and dead plus live plus SSE were the only load combinations considered. Explain and justify the exclusion of load combinations for tornado wind (W_t) and pressure loads associated with the postulated pipe break (Pa).

2) The following questions refer to Appendix A to reference 1 describing the working stress design allowables permitted for reinforced masonry walls at Watts Bar:

   a) The values indicated are not related to the type of stresses that occur in masonry construction (i.e., axial or flexural compression, bearing, shear in masonry, shear in reinforcement, etc.). Please elaborate on the allowable stresses used and indicate whether or not the values used conform to the requirements of ACI 531-79, "Building Code Requirements for Concrete Masonry Structures." If any of the allowables does not conform to ACI 531-79, indicate the difference and provide justification.

   b) Provide allowable stresses for mortar used in bed and collar joints.

c) Justify the 25% allowable stress increase in reinforcing steel permitted for Load Case II, (D+L+E). The "SEB Criteria for Safety-Related Masonry Wall Evaluation" does not permit increases in allowable stresses for OBE loads.

3) The following questions refer to Appendix A of reference 2:

a) Section 3.3.1, Service Load Combinations, excludes consideration of the Operating Basis Earthquake (OBE). Explain and justify this exclusion.

b) Section 3.3.2, Extreme Environmental and Abnormal Loads, omits the load factor of 1.25 from load cases including pressure from pipe rupture (Pa) and the Safe Shutdown Earthquake (E'). Also, the load case "D+1.5Pa" is omitted from consideration. Explain and justify these omissions.

c) In sections 3.4.6.1 and 3.4.6.2, explain why tensile strength and shear strength were not considered in the analysis of continuous vertical joints and bed joints.

4) In the dynamic analysis of both reinforced and unreinforced masonry walls indicate whether or not consideration of cracked walls was made. Discuss how this consideration was made and the effect on the period of the walls during a seismic event.

5) Provide a description of the analysis and evaluation of unreinforced, unmortared masonry walls. Provide sample calculations.