

APR 2 1973

Mr. J. D. Phillips
Vice President and Chief Engineer
Arkansas Power and Light Company
Sixth and Pine Streets
Pine Bluff, Arkansas 71601

Dear Mr. Phillips:

We have completed our review and evaluation of the design of the Emergency Cooling Pond for Arkansas Nuclear One - Unit 1 and have concluded that some modification of the pond design is necessary before Unit 1 is licensed.

The Emergency Pond, in conjunction with the Dardanelle Reservoir, is the ultimate heat sink for this plant. During the construction permit review for Arkansas Nuclear One - Unit 2 we agreed that the pond could be designed to withstand both the Design Basis Earthquake (DBE) and the simultaneous occurrence of the Operating Basis Earthquake and one-half the local Probable Maximum Precipitation (PMP). Your analysis of this latter combination of conditions calculated a backwater crest of 350.0 feet MSL, three feet above the top of the spillway (347 feet MSL). The dike around the pond has its top at 351 feet MSL, affording only a foot of freeboard at the reference condition.

The AEC staff independently analyzed the reference condition and calculated a backwater crest of 350.3 feet MSL. Thus, there is no significant difference in our calculation of the crest. However, we must question the meager freeboard allowance associated with this crest. Our safety concern is that, with a slightly higher backwater crest, the dike can be overtopped. This is an unsealed earthen dam which can be thereby eroded. Erosion could cut away the dike, especially in the area adjacent to the spillway, down to the 341 feet MSL level, completely emptying the pond.

Our standard practice is to require a minimum of three feet of freeboard for small dams. For dams where failure would cause a major hazard to the public, a minimum of five feet of freeboard is standard practice. These practices are based on providing freeboard to compensate for (1) wind and

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wave action estimates, (2) errors in estimating the flood used to design the spillway, (3) errors in determining the discharge characteristics of the spillway, and (4) allowing for settlement of the dam over a period of time. These freeboard allowances are based on Corps of Engineers and Bureau of Reclamation criteria with which we concur and which we have consistently applied at other sites. References include:

EC 1110-2-27, Policies and Procedures Pertaining to Determination of Spillway Capacities and Freeboard Allowances for Dams, U. S. Army Corps of Engineers, August 1, 1966.

ETL 1110-2-8, Computation of Freeboard Allowances for Waves In Reservoir, U. S. Army Corps of Engineers, August 1, 1966.

Design of Small Dams (Section 136-Freeboard), Bureau of Reclamation, 1961.

The freeboard allowance is, therefore, a design margin which should not enter into the direct water level calculation.

Your staff has informed us that the Emergency Pond construction has been completed. This does not alter our conclusion that the present dike is inadequate. Before Unit 1 can be licensed, you will be required to provide additional freeboard allowance by raising the top of the dike to at least 353 feet MSL. Since the pond is complete, alternate equivalent measures can be acceptable such as erosion sealing the dike or increasing the spillway capacity. Please inform us within thirty (30) days of the measures you propose to correct this deficiency.

Sincerely,

Original signed by
Roger S. Boyd

A. Giambusso, Deputy Director for
Reactor Projects

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