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Docket Nos: 50-327
and 50-328

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

Dear Mr. Parris:

Subject: Tornado Missile Protection for Sequoyah Units

In Supplement No. 5 to the Safety Evaluation Report for the Sequoyah facility we stated that further information was needed to determine the adequacy of protection for the 480-V transformers against tornado missile strikes.

On the basis of your submittal of August 10, 1981, we conclude that the TVA design does not provide adequate tornado missile protection for the transformers.

Enclosed is our safety evaluation update which states that positive vent opening protection against one inch diameter steel tornado missile is required.

Your comments on our position are requested by November 30, 1981.

Sincerely,

/S/

Robert L. Tedesco, Assistant Director
for Licensing
Division of Licensing

Enclosure:
As stated

cc:
See next page

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SEQUOYAH

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Commission
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SUPPLEMENTAL SAFETY EVALUATION REPORT INPUT
SEQUOYAH NUCLEAR PLANT

In Section 3.5 of the Sequoyah Nuclear Plant Supplement Number 5 to the Safety Evaluation Report concern was expressed that tornado generated missiles might penetrate the ventilation openings in the roof of the auxiliary building and damage certain safety related 480 volt transformers. We requested that TVA provide information which assures that their design provides adequate protection for the 480 volt transformers against tornado missile strikes or propose additional protection for our review and approval.

TVA submitted an assessment of the potential for damage to the 480 volt shutdown transformers from tornado missiles in a letter dated August 10, 1981. This assessment contains a derivation of the total event probability of a vertical tornado missile impacting one of the intake or exhaust vents on the roof of the auxiliary building. The total event probability calculated by TVA is the product of the following conditional probabilities: P_s, P_n, P_v and P_a, where

P_s is the probability of a tornado striking the plant;

P_n is the probability of a missile striking a safety-related building given a tornado strike; and

P_v is the probability of a vertical strike on a horizontal roof surface given a missile has impacted a safety-related building.

P_s is the probability of the missile striking that area of the roof containing a vent, given that a tornado missile has hit the roof.

The product of P_s and P_n is taken from results contained in EPRI Report EPRI NP-768 entitled "Tornado Missile Risk Analysis" dated May 1978. In this report a computer simulation code is used to estimate the likelihood of tornado missile strikes. The basic approach relies on modeling techniques to describe each phase of the missile generation, transport and impact process. The computer simulation code has the capability to model specific plant configurations, missile characteristics and origin zones, and regional tornado input data.

TVA used a $P_s * P_n$ value from EPRI NP-768 computed for an assumed two unit plant site arrangement. The assumed plant site consists of a unit in operation and a unit under construction. A significant difference between the Sequoyah plant site and the assumed plant site in the study is that at Sequoyah the turbine building, which is more than 30 feet higher than that portion of the auxiliary building roof containing the vent openings, is west of and immediately adjacent to the auxiliary building and has not been designed for tornado winds. More than half of the tornadoesin the area of the Sequoyah plant site originate from the southwest and travel in a northeasterly direction. Therefore, tornadoes passing over or near the auxiliary building would be expected to encounter the turbine building first.

In the EPRI study missiles originating from an elevation higher than the auxiliary building roof are considered, but these missiles are uniformly distributed over the area of the unit under construction. The two units in this study are separated by about 125 feet at their closest points and each unit has its own auxiliary and turbine building. At Sequoyah the plant layout is different in that a single auxiliary building and a single turbine building are shared between units. For the Sequoyah site the turbine building is 30 feet higher

than the auxiliary building roof and thus represents a significant source of tornado missiles to the auxiliary building roof.

Due to the close proximity of the turbine building to the vent openings and the sensitivity of missile strike probability to the distance between the original missile location and the target we believe that the EPRI results are not directly applicable to the Sequoyah plant site.

We therefor: conclude that the TVA design does not provide adequate tornado missile protection for the 480 volt essential transformers. It is our position, therefore, that TVA should provide positive protection against the one inch diameter steel rod tornado missiles for the vent openings on the auxiliary building roof.