TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

Regulatory File Cy.

October 31, 1972

Mr. R. C. DeYoung, Assistant Director
for Pressurized Water Reactors
Directorate of Licensing
United States Atomic Energy Commission
Washington, DC 20545

Dear Mr. DeYoung:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

As requested in your letter of September 26, 1972, TVA has reviewed the Watts Bar Nuclear Plant design to determine whether the failure of noncategory I (seismic) equipment could result in a condition that might potentially adversely affect the performance of safety-related equipment required for safe shutdown of the facility or for limiting the consequences of an accident. The following discussion presents the applicable basic plant design bases and results of our review.

The pertinent basic criteria to which the plant is designed are:

1. All essential safety-related equipment is located in seismically qualified structures or areas.

2. Fluid containing noncategory I equipment that is located in areas containing essential safety-related equipment is provided with seismically qualified means for timely isolation where required.

The following areas were reexamined to determine that timely isolation following the failure of fluid containing noncategory I equipment could be achieved even if the event occurred in a nonseismically qualified structure.

Turbine Building

Failure of the condenser circulating water system in the turbine building would cause no direct flooding of essential safety-related equipment. Indirect flooding of essential equipment would require

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filling the turbine building to an elevation above 713 feet (requiring approximately 9 x 10^6 gallons of water), thus permitting flow of water (by paths through the service building) into the auxiliary building. The auxiliary building could also tolerate an appreciable quantity of water before flooding essential equipment.

The cooling towers and associated piping, condensers, etc., contain approximately 1.1 x 10^7 gallons of water that could potentially be released to the turbine building in the event of failure of the condenser circulating water system. The tower system receives makeup water from the raw cooling water system, the cooling tower makeup pumps, and the essential raw cooling water system. The latter system is a category I (seismic) system and its flow could be diverted from the towers by operator action. The other makeup sources are noncategory I systems, and in the event that operator action failed to trip the pumps within 15 to 20 minutes, the power to the plant could be interrupted as a result of communication with the offsite power grid dispatcher. The condenser circulating water pumps would also be tripped, but this will not stop the flooding because the tower basins are at a higher elevation than the turbine building area of concern.

In addition to the 1.1 x 10^7 gallons of water described above, during the time period required to assure tripping of the pumps, 1.5 x 10^6 gallons of water could be added by the makeup system. Therefore, a maximum of approximately 12.5 x 10^6 gallons of water could be released to the turbine building. This could result in a water level approximately four feet above the threshold of the door from the service building to the auxiliary building. Therefore, the door to the auxiliary building will be designed to withstand such water heads and restrict leakage into the auxiliary building to an acceptable rate. This will assure that no essential safety-related equipment will be flooded due to failure of the condenser circulating water system in the turbine building. This is the worst case of flooding that can be caused by equipment failure.

Auxiliary Building

Large noncategory I reservoirs (e.g., the condensate water storage tank), cooling water systems, fire protection systems, etc., capable of producing unacceptable flooding in the auxiliary building are isolatable from the building by seismically qualified isolation valves. Water level monitors are located at appropriate points in the building to warn that flooding may be occurring. For sources

potentially capable of unacceptable flooding, approximately 15 minutes minimum time would be available for operator action to accomplish isolation. The refueling water storage tank is not isolatable but its contents can be tolerated without flooding essential equipment. This tank and all of its associated piping are seismically qualified and constructed to quality assurance requirements.

Diesel Generator Building

All water systems entering the diesel generator building having significant flow capacity are seismically qualified. Under worst case conditions, flooding in a given diesel generator room could cause damage leading to loss of the associated power source. However, no single failure of the water systems could cause flooding of more than one generator since the common (and only) access to the individual diesel generator rooms is provided with a drain capable of handling the largest water source.

Intake Pumping Station

The pumping station could sustain the worst case of flooding without loss of minimum required capacity of the essential raw cooling water system (ERCWS). The ERCW pumps are mounted on the top deck of the station, and are supplied electrical power by means of cables designed for submerged operation.

Reactor Containment Building

All water supplies to the reactor containment are seismically qualified and are provided with qualified isolation valves. Water level monitors in the sumps and other locations would provide warning that flooding may be occurring and ample time would be available for operator action to accomplish isolation of the appropriate water source. No essential equipment would be flooded.

Although our review has shown a potential for flooding in certain structures due to failure of noncategory I equipment, we feel that the design of the Watts Bar Nuclear Plant is such that safety-related equipment required for safe shutdown of the plant or for limiting the consequences of an accident will not be adversely affected.

We hope this response will satisfactorily resolve the questions raised in your letter.

Very truly yours,

J. E. Gilleland

J. E. Gilleland
Assistant to the Manager of Power