830 Power Building
TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401

Central File
50-390
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JUL 28 1977

Mr. Norman C. Moseley, Director
Office of Inspection and Enforcement
U.S. Nuclear Eregulatory Commission
Region II - Suite 1217
230 Peachtree Street, NW.
Atlanta, Georgia 30303

Dear Mr. Moseley:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - REPORTABLE DEFICIENCY - ERCW DISCHARGE PIPELINE

The subject deficiency was initially reported to NRC-OIE Region II, Inspector V. L. Brownlee, on March 30, 1977, in accordance with 10 CFR 50.55(e) and the first interim report was transmitted on May 2, 1977. Enclosed is our final report on this deficiency.

Very truly yours,

J. E. Gilleland
Assistant Manager of Power

Enclosure

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WATTS BAR NUCLEAR PLANT
UNITS 1 AND 2
REPORTABLE DEFICIENCY
ESSENTIAL RAW COOLING WATER DISCHARGE PIPELINES
DESIGN DEFICIENCY

Description of Condition

The Essential Raw Cooling Water (ERCW) system design bases require a seismically qualified means to discharge ERCW from the plant. Although the ERCW discharge pipelines are Seismic Category I, they have been routed through an area of the plant site for which adequate foundation information is unavailable and through slopes which have not been seismically qualified as shown on Drawing 17W302-1R6 (Figure 1).

Safety Implications

The Essential Raw Cooling Water System is required to provide cooling water to various safety and non-safety loads throughout the plant. Adequate discharge of the ERCW water is necessary to assure the required cooling water flow rates. The discharge is normally to the cooling tower basins. If this flow path is unavailable, discharge of ERCW is to the yard drainage holding pond.

The ERCW discharge system, as presently designed, satisfies each requirement of the applicable design bases and criteria except the Seismic Category I requirements for foundation qualification. Thus, under normal operating conditions the deficiency would not have adversely affected the safe operation of the plant.

If, in the event of an earthquake, the normal discharge to the cooling tower basins becomes unavailable, one of two possible implications to safety could result had the deficiency gone uncorrected. The first would be the movement of the unqualified discharge foundation and yard slopes such that the discharge piping ruptured without discharge flow restriction occurring. This could result in ERCW discharge flow to a site area other than the yard drainage holding pond. Examination has shown that there exists no area where such a rupture would cause flooding of safety-related buildings and equipment.

The second implication to safety would be blockage of the discharge lines. Movement of the slopes through which the lines are routed could either pinch the lines, rupture the lines and subsequently plug the lines, or cover the holding pond discharge point of the lines. Any restriction to the discharge could lower the cooling water flow rates below their design values and subsequently cause insufficient cooling to

safety equipment in the plant. This could damage safety equipment such as the emergency diesel generators or degrade performance on safety equipment such as the RHR heat exchangers such that they become unable to perform their safety function and the safety of the plant could be jeopardized. Since the ERCW discharges for both trains are located in the same area, the probability exists that both units would be affected simultaneously.

Corrective Action Taken

An ERCW Discharge Overflow Structure (DOS) is being designed and will be constructed along the discharge piping route such that the ERCW system will still function as designed under all conditions.

Structure-Site Relationship - Drawing 10N210R8 (Figure 2) shows the relationship of the planned DOS to the rest of the plant structures. Drawings 10W241R1 and 10W330R1 (Figures 3 and 4) show the relationship of the plant structures to the grading plan around the DOS structure and to the surrounding site topography, respectively.

Location Design Basis - The structure is designed such that the existing topography is not changed. If the discharge piping downstream of the DOS are blocked or fail, the ERCW discharge from the DOS will flow off the main plant area without flooding any Category I structures. The location will allow the ERCW discharge to flow into the site drainage system or, if that is plugged, to flow on top of the ground away from the plant. The basis for the flow studies was the 100-year rainstorm coupled with the maximum normal discharge from the ERCW system. A chain link security fence through which this flow will pass was assumed to be half blocked. Using this criteria, the maximum elevation of the flow will not exceed Elevation 728. This elevation is below the entrances to any adjacent safety-related structures (see FSAR Section 2.4.1.1). The DOS is located in the main plant area where numerous soil investigations have been performed. These investigations show that the DOS is located on soils which pose no stability problems during an earthquake.

Structure Description - The DOS will be supported on granular fill above basal gravel (see subsection 2.5.4.2 of FSAR for discussion of subsurface materials). Any fine grained soils above the basal gravel will be excavated and replaced with granular fill to the base of the DOS. The granular fill will meet the requirements of subsection 2.5.4.5.2 of the FSAR and will be compacted to 85 percent relative density as determined by ASTM D2049. Figure 5 is a preliminary sketch of the planned structure. If normal discharge to the cooling tower basins is blocked, the ERCW discharge pipes will discharge into the DOS which is open to atmospheric pressure. When the pipes downstream of the DOS are not blocked, the water will flow out of the DOS, through the pipes, and be discharged

into the yard drainage holding pond. If the discharge pipes downstream of the DOS are blocked, the water level in the DOS will build up until it reaches the overflow weir. The overflow weir will be designed to handle the maximum ERCW discharge without causing unacceptable back-pressure in the ERCW system.

Structural Design Basis - The DOS will be designed for the same design conditions as other Category I ERCW miscellaneous structures (see Section 3.8.4 of the FSAR).

Summary

The subject design deficiency has been corrected by adding an overflow structure. The DOS and that portion of the ERCW pipelines which will retain a Category I classification are situated in areas for which sufficient foundation information is available to ensure an adequate foundation for both items. The ERCW system will now provide design flow even if the normal discharge lines to the cooling tower basins and to the yard drainage holding pond are blocked. The FSAR will be updated as soon as the design of the DOS is completed.