

ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
POSSIBLE UNCONSERVATIVE PRESSURIZER RELIEF
AND SAFETY LINE BLOWDOWN ANALYSIS

NCR CWB 78-2
FINAL REPORT
10 CFR 50.55(e)

Description of Deficiency

EDS Nuclear, Incorporated (EDS), a consulting engineering firm for TVA, performed a blowdown analysis of the pressurizer relief and safety lines using the computer program, RELAP4/MOD1. Use of this program required that safety and relief valve water seal temperatures be modeled at approximately 600 degrees F (saturation temperature at the system design pressure), instead of the defined temperature of 200 degrees F. This was due to program instability when using the lower temperature. RELAP4/MOD5 is a revised version of the original program capable of analyzing for 200 degrees F. Its use on similar projects outside TVA has produced results which indicate the number of supports required and their design loads may increase over the original analysis due to increased water slug effects.

RELAP4/MOD1 represented the state of the art at the time the analysis was performed. The analysis was originally analyzed at 600 degrees F and not 200 degrees F because the program became unstable with the use of the lower temperature. At the time the MOD1 version was being used, the higher temperature was evaluated and it was concluded the results would not be significantly affected.

Safety Implications

If the deficiency had gone uncorrected, the pressurizer safety and relief lines may not have been conservatively designed. Therefore, for the purposes of this analysis, it is assumed that the supports could not have withstood their actual loads. The consequence of this would be possible system failure. If failure occurred downstream of the system's isolation valves, the isolation valves would close the lines before any significant safety hazard developed. If the system failure occurred upstream of the isolation valves, this would result in a pressurizer line blowdown which could not be closed off and would create a LOCA condition. However, the plant is designed to mitigate the consequences of such an event as described in Chapter 15 of the FSAR.

Corrective Action

EDS reanalyzed the system using RELAP4/MOD5 with 200°F water temperature. This reanalysis required some minor pipe support modifications. However, certain components of the nozzle loads on the pressurizer and pressurizer relief tank nozzles exceeded the allowable loads defined in Westinghouse specifications. These loads were sent to Westinghouse for a detailed review and Westinghouse has since informed TVA that all of the loads are acceptable.

All support design, review, requalification and new design are completed.

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