

ENCLOSURE

SEQUOYAH NUCLEAR PLANT UNITS 1 AND 2
PIPE SUPPORT DESIGNERS DID NOT IN SOME CASES CONSIDER THE SUM
OF DEFLECTIONS DUE TO THERMAL, STATIC, AND SAFE SHUTDOWN EARTHQUAKE
NCR SWP 79-S-7
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

The design of some rigid and some variable spring pipe supports at Sequoyah Nuclear Plant did not consider the sum of static, thermal, and safe shutdown earthquake (SSE) deflections. In most of these cases, the designers selected the largest of the three deflections mentioned above. Designers contributing to this deficiency are both at TVA and at Basic Engineers in Pittsburgh, Pennsylvania (a division of Dravo), who performed some pipe hanger design work on contract from TVA.

Sufficient deflection during an SSE not figured into the design could result in either insufficient clearance available to prevent contact between the pipe and its support or the available deflection of variable spring supports being insufficient to prevent overextension. Contact between pipe and support or overextension of a spring pipe support could possibly lead to overstressing of the piping and/or the affected support. Some of the pipes supported by defective supports are safety related.

This deficiency was discovered by TVA engineers investigating another 10 CFR 50.55(e) item dealing with movement of the steel containment vessel (SCV) which would result from a design basis accident (NCR CEB 79-19). TVA considers this deficiency to be reportable because of the possibility for high stress areas and possible subsequent failure because of overstressing in safety-related piping and supports during an SSE event.

The cause of this deficiency is the failure of engineers at TVA and at Basic Engineers to follow a design criteria document which specifies that deflections because of thermal, dead weight, and SSE be summed in designing pipe supports.

Safety Implications

If this deficiency had remained uncorrected, an SSE event during plant operation might have led to some overstressing with subsequent failure breaks in some safety-related piping and supports (e.g., RHR and Auxiliary Feedwater). As such, the possible overstressing with subsequent failure in safety-related piping and supports might have impaired the ability of the plant to reach a safe shutdown condition.

Corrective Actions

The approximately 3300 potentially deficient piping supports have been reviewed and checked to verify correctness of the design. As a result of this design review, 41 hangers have been identified as requiring modification, either in hardware or in setting the spring on variable spring type supports. Design

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work to support these modifications is complete, and work at the site should begin in the near future with completion before attaining 1% power on the respective units.

Pipe supports at other TVA nuclear plants have been investigated and no similar deficiencies were found to exist except at Watts Bar Nuclear Plant. Please see TVA's report on NCR SWP 79-W-7, which reports on a similar deficiency found at Watts Bar Nuclear Plant.

Means Taken to Prevent Recurrence

All TVA designers engaged in the design or redesign of Sequoyah Nuclear Plant pipe supports have been individually instructed in the proper design of supports to include the consideration of the sum of the static, thermal, and SSE deflections.

Basic Engineers, having completed its contractual obligations, is no longer designing supports for Sequoyah Nuclear Plant. Basic Engineers has been informed of this deficiency.