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)
FIRST INTERIM 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, PA (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 over-extension. Once contact between pipe and support or over-extension of a spring pipe support occurs, a high stress point results which 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 (NCR CEB 79-19) dealing with movement of the steel containment vessel (SCV) following a design basis accident inside containment and resulting effects on piping which penetrates the SCV. TVA considers this deficiency to be reportable because of the possibility for high stress areas and possible subsequent failure due to overstressing in safety-related piping and supports during an SSE event.

The cause of this deficiency is the failure of some engineers at TVA and at Basic Engineers to follow a design criteria document which specifies that deflections due to 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 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.

Pipe supports at other TVA nuclear plants are presently being investigated to ensure that this deficiency does not exist at those plants.

Means Taken To Prevent Recurrence

TVA is presently investigating the means that will be taken to prevent recurrence of this type deficiency. These measures will be detailed in a subsequent report on this deficiency.