ENCLOSURE

HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS, ALL UNITS
SAFETY RELIEF VALVE CONTROL SYSTEM
10CFR50.55(e) REPORT NO. 3 (FINAL)
NCR GE-1

On October 11, 1977, TVA notified NRC-OIE Region II, Inspector J. K. Rausch, that General Electric (GE) had reported a 10 CFR Part 21 design deficiency to the NRC-OIE Washington office and that TVA was reporting it under 10 CFR Part 50.55(e) for the Hartsville and Phipps Bend Nuclear Plants. Previous interim reports have been submitted by TVA on November 14, 1977, and May 11, 1978. This is the final report on this deficiency.

Description of Deficiency

The design deficiency identified by GE concerns the potential for multiple-consecutive safety relief valve (SRV) actuations following a reactor isolation transient event. Isolation of the primary system will cause a pressure rise within the reactor vessel. When the pressure reaches the setpoints of the SRV's, the valves will open and discharge steam into the suppression pool, thereby counteracting and eventually reducing the primary system pressure. When the system pressure drops sufficiently, the valves will automatically reclose. However, the decay heat produced by the core will cause the pressure to rise again resulting in repeated SRV actuations. Multiple-consecutive SRV actuations could result in containment loads higher than design loads due to an increase in the length of the water leg and internal energy of the airspace in the SRV discharge line, as compared to that normally existing before an initial SRV actuation.

Cause of the Deficiency

The deficiency existed because GE had previously assumed that containment loads were sufficiently low from SRV discharges that they were classified as secondary loads. However, this assumption did not consider the potential for multiple SRV actuations. The discovery of the design deficiency by GE resulted from a more detailed transient analysis indicating that several SRV's would experience consecutive actuations following a design basis reactor isolation transient.

Safety Implications

Multiple-consecutive actuation of safety relief valves following a reactor isolation transient event could result in containment loads higher than design loads and possibly leading to a loss of containment integrity.

Corrective Actions

GE's letter to Edson G. Case (NRR) from Glenn G. Sherwood dated December 16, 1977, provided preliminary information on a proposed low-low setpoint relief logic addition to the relief valve control system to correct this deficiency and the letter dated January 31, 1978, provided additional information regarding the design and analysis of the proposed low-low set relief logic. Those submittals constituted GE's final proposed modification.

In Enclosure 2 of our May 11, 1978, interim report, TVA included the material from the GE January 31, 1978, submittal to NRC-NRR and indicated TVA would file a final report on the deficiency when NRC completes their review of the proposed GE modification. TVA did at that time and still does endorse the modifications proposed by GE to correct this deficiency. TVA will implement the GE modification and appropriate measures as approved by NRC.