ENCLOSURE

HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS - ALL UNITS
DESIGN DEFICIENCY OF T-HEAD SECTION OF
ANCHOR/DARLING GATE VALVES
10CFR50.55(e) REPORT NO. 1 (FINAL)
NCR-6

On October 19, 1979, TVA notified NRC-OIE Region II, Inspector F. S. Cantrell, of a potentially reportable condition under 10CFR50.55(e) regarding a design deficiency of the T-head section of the disk of the Anchor/Darling Valve Company (Anchor/Darling) gate valves supplied or to be supplied for the Hartsville and Phipps Bend Nuclear Plants.

This is the final report on the subject reportable deficiency.

Description of Deficiency

Anchor/Darling informed TVA that they had discovered a design deficiency in 12-inch, 900-pound, flex wedge gate valves. The deficiency involves underdesign of the T-head on the disk or gate. An analysis by Anchor/Darling showed the stress in the T-head area of the disk (the point where the valve stem connects to the disk) exceeds the Anchor/Darling established allowable stress, 1.5 x SA (SA is defined by ASME Section III Appendix I, Table I-7-1) but is less than the yield strength.

This deficiency exists on 14 valves shipped to the Hartsville Nuclear Plant for use as normally closed isolation valves in residual heat removal, high pressure core spray, and low pressure core spray systems in units A1 and B1. The deficiency also exists for similar valves which were procured to the same contract but have not been shipped to Hartsville or Phipps Bend. Anchor/Darling has indicated to TVA that they have not found this deficiency to be present on any other valves previously provided for any other nuclear plants.

Cause of the Deficiency

The valve was not designed to meet the TVA valve design specification. This design has been in use by Anchor/Darling for a number of years and has been evaluated for lower service requirements. The evaluation to the TVA valve design specification was prompted by the failure of a similar T-head design on a 20-inch, 300-pound valve made by Anchor/Darling for the Cooper Station owned by Nebraska Public Power District.

Safety Implication

The deficient valves serve as normally closed isolation valves in three safety systems. Should the T-head section of one of these valves break during the course of an accident, the valve would not open and the division of the safety system it is in would not be available to serve its safety function.

Corrective Actions

The subject deficient valves shipped to the Hartsville Nuclear Plant (14 in all) were shipped back to Anchor/Darling on November 8, 1979. Each of these 14 valves and other valves of this type made for TVA before discovery of the deficiency, but not shipped to Hartsville or Phipps Bend, will have reinforcing weld metal added according to approved repair procedures to the T-head section of the disk to give it the required strength. After the deficiency was discovered by Anchor/Darling the pattern for the disk section was altered to add additional strength to the T-head section for valves of this type produced afterwards for the Hartsville or Phipps Bend Nuclear Plants.

Anchor/Darling has reviewed all similar valve designs provided by them for nuclear service and concluded that the subject deficient valves being provided to TVA are the only ones with this design deficiency. This review has been verified by NRC-OIE Region IV audit on October 29 through November 1, 1979, at Anchor/Darling.

Means Taken to Prevent Recurrence

Anchor/Darling has implemented the evaluation of the T-head section for the specific service condition as defined by valve design specifications into their internal design standard. Implementation of this specification should prevent recurrence of similar design problems.