

ENCLOSURE

HARTSVILLE AND PHIPPS BEND NUCLEAR PLANTS - ALL UNITS  
CONDENSATE HEADER VORTEX BREAKERS  
LEFT OUT OF PIPING ARRANGEMENT DRAWINGS  
10CFR50.55(e) - REPORT NO. 1 (FINAL)  
NCR CFB-6

On December 14, 1979, TVA notified NRC-OIE Region II, Inspector R. W. Wright, of a reportable deficiency concerning the omission of condensate header vortex breakers from final standard reactor island design (STRIDE) piping arrangement drawings issued by C. F. Braun to the field for construction. This is the final report on the subject reportable deficiency.

Description of Deficiency

Vortex breakers which should have been included in the high-pressure core spray (HPCS) and reactor core isolation cooling (RCIC) system suction lines which are connected to the condensate header were left out of the piping arrangement drawings issued to the field. These piping arrangement drawings have been employed to construct the portion of the piping which should have included the vortex breakers on Hartsville Nuclear Plant unit A1.

At this time none of the other Hartsville or Phipps Bend units have had this piping installed. These two plants are the only nuclear plants involved since they are the only plants employing the STRIDE design.

The HPCS and RCIC suction lines take feed from the 36-inch condensate header which receives its water supply from the condensate storage tank. The vortex breakers are SA-36 steel plates arranged in a flow straightener pattern inside the suction piping to prevent entrapment of air and flow rate reduction in the suction lines. These breakers are required in case a failure of the inlet piping to the condensate header introduces air into the header and down the suction lines. Normally, a low water level in the condensate header would result in automatic transfer of HPCS and RCIC to the suppression pool water supply, but a vortex formed in the condensate header extending down into the suction lines could defeat the low water level indicators in the condensate header.

Cause of Deficiency

The vortex breakers were properly shown on the C. F. Braun system piping and instrumentation diagram (P&ID), but were inadvertently not transferred to the piping arrangement drawings. The C. F. Braun "consistency check" made to compare system design requirements with construction drawings prior to their issuance also failed to pick up the omission of the vortex breakers.

This omission occurred because the review of the drawings by two groups did not properly interface or overlap and as a consequence this item was overlooked.

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This situation was discovered by a C. F. Braun senior engineer who was working with the drawings and who noticed the omission of the vortex breakers.

#### Safety Implications

Omission of the vortex breakers could cause entrapment of air and flow rate reduction in the suction line to the HPCS and RCIC pumps upon loss of the inlet line to the condensate header. This air entrapment could cause possible cavitation of and damage to these safety-related pumps, thereby compromising the performance of their safety functions.

#### Corrective Action

The Hartsville unit A1 piping which has been installed without the vortex breakers will have the vortex breakers installed in the existing piping. Fortunately, personnel access is available to the area where the vortex breakers may be welded in place.

The STRIDE piping arrangement drawings for the other five Hartsville and Phipps Bend units have been revised to show the vortex breakers as required. This drawing revision will ensure proper installation of the vortex breakers for the other five units.

#### Action to Prevent Recurrence

C. F. Braun has placed additional emphasis on their "consistency check" made to ensure that construction drawings include all design requirements. C. F. Braun's internal QA procedure now includes a checklist item to ensure continuity between contributing groups or disciplines.