AEOD TECHNICAL REVIEW REPORT*

UNITS: Palo Verde Units 1 & 2
DOCKET NOS.: 528 and 529
LICENSEE: Arizona Public Service

TR REPORT NO. AEOD/T702
DATE:
EVALUATOR/CONTACT: T. C. Cintula

SUBJECT: LEAKING PULSATION DAMPENER LEADS TO LOSS OF CHARGING SYSTEM

EVENT DATES: February 18, July 12, and July 18, 1986

SUMMARY

Three events of a loss of charging pump suction at Palo Verde are described. The positive displacement pumps lost suction when their gas-filled pulsation dampener or gas-filled suction stabilizer leaked. In two events, the failed pulsation dampener led to all three positive displacement pumps becoming gas bound through their common suction header. The positive displacement pumps at Palo Verde are not safety-related. Subsequent investigation concluded that a postulated similar failure of the pulsation dampener would not affect the safety-related charging pumps at Westinghouse plants, but could impair the safety-related charging pumps at San Onofre 2 and 3 (the only Combustion Engineering plants with a safety-related charging system). NRR has been alerted of this finding by separate memorandum. Similar failures of the suction stabilizers have been investigated and documented by previous reports and no additional recommendations were identified by this study.

DISCUSSION

In three events at the Palo Verde Nuclear Generating Station the charging pumps became filled with gas and failed to operate. The source of gas was traced to a failure of a bladder in either the pulsation dampener (also referred to as a pulsation damper) or the suction stabilizer. The details of each event follow.

1. Palo Verde Unit 1 on February 18, 1986

The unit was at 100% power during a routine dilution of the reactor coolant system (RCS). All three positive displacement charging pumps (PDPs A, B, and E) were running and PDPs A and E were being used for a dilution evolution. The B PDP was being operated for a post-maintenance packing run-in, prior to being placed into normal operation. Their common pump suction header was being supplied by the makeup water section of the chemical and volume control system (CVCS).

At the start of the RCS dilution, the VCT isolated as designed when its outlet check valve (CH-V118) seated from the higher pressure of the makeup water section. When the RCS dilution was completed, and the makeup water source was secured, it should have resulted in the VCT automatically supplying charging pump suction through the reopening of the VCT outlet check valve (see Figure 1). However, the licensed operators immediately noted a decrease in charging pump flow. At this time, the charging pump header flowmeter indicated 17 gpm for a condition that should have provided a header flow of approximately 132 gpm

*This document supports ongoing AEOD and NRC activities and does not represent the position or requirements of the responsible NRC program office.

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