

SNUPPS

Standardized Nuclear Unit
Power Plant System

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April 20, 1983

SLNRC 83-020 FILE: 0491.10.2
SUBJ: Final Report: Failure to Close,
Anchor/Darling Check Valves
(SDR 83-06)

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Docket Nos. STN 50-482 and STN 50-483

Gentlemen:

On March 23, 1983, NRC Region III and Region IV representatives were informed by SNUPPS Staff (S. Seiken, R. White) of a deficiency in Callaway and Wolf Creek check valves manufactured by Anchor/Darling. During the March 23 notifications it was explained that check valves in the discharge lines of two of the four component cooling water pumps at the Callaway site had failed to close during startup testing of the pumps. It was also reported that preliminary information indicated a design or material defect may have led to the failures, and that there were four check valves of the same design at each of the two SNUPPS sites (Valves EG-V003, -V007, -V012, and -V016). On the basis of a preliminary engineering assessment, it appeared that, had this deficiency gone uncorrected, failure of these valves could occur under certain conditions and could result in any or all of the following: cavitation damage to component cooling water pumps; a significant reduction in component cooling water with a resultant loss of adequate cooling to several safety-related pumps, including safety injection and residual heat removal pumps; and reverse flow through the parallel-connected component cooling water pump, resulting in uncertain starting capability on demand.

Since the March 23 notifications it has been confirmed that the valve failures were caused by improper design, specifically the use of incompatible materials of similar hardness for the valve seat hinge pins and bushings. This incompatibility resulted in pin/bushing galling and eventual freezing of the valve seat in the open position. This valve deficiency was also reported to the NRC by Anchor/Darling on March 31, 1983, pursuant to 10CFR21 reporting requirements.

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A review of materials requirements has been conducted for all check valves in safety-related service, covering valves furnished by all SNUPPS vendors including Anchor/Darling. It has been determined that, in addition to the four component cooling water pump discharge check valves, a similar hinge pin/bushing materials incompatibility exists in four other Anchor/Darling check valves installed in the feedwater systems at each SNUPPS site (Valves AE-V120, -V121, -V122, and -V123).

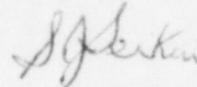
Arrangements are currently underway to correct, repair or rework the eight check valves at each site as follows:

1. Callaway - As a temporary fix, replacement hinge pins and Type 416 heat treated bushings will be installed in the two damaged 20" component cooling water pump discharge check valves. This temporary fix will enable system and component testing to continue until a permanent fix is completed.
2. Callaway and Wolf Creek - As a permanent fix, replacement Stellite 6 bushings, and replacement hinge pins if required, will be installed in each of the eight affected valves at Callaway and at Wolf Creek.

Shipment of the replacement Stellite 6 bushings by Anchor/Darling is not anticipated before May, 1983. Installation of the replacement bushings will be complete prior to final turnover of the component cooling water and feedwater systems at each site. These valve repairs and bushing replacements will be accomplished according to established construction and rework practices and procedures at Callaway and Wolf Creek.

This report should be considered the final report concerning the Anchor/Darling check valve deficiency. The NRC will be informed should there be any new developments.

Very truly yours,



S. J. Seiken
Manager, Quality Assurance

RPW/dck/9a14

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