Technical Bulletin

Response To NRC Information Notice No. 90-21

BIF VALVES
Product Improvement Recommendation

9901186

Resilient Seat Material Upgrade

And Mechanical Seat Retention Design Modification

In October of 1988 Duke Power, Catawba Nuclear Station Unit 1, experienced a failure to open on a motor-operated BIF butterfly valve. The valve was in the service water system and failed to open under high differential pressure. The circumstance of this valve failure was reported to the NRC which initiated NRC Information Notice No. 90-21.

Prior to this failure Duke and ENERTECH had already identified soft seat material as a potential problem and had initiated an investigation into seat materials. This proactive approach enabled the utility to immediately evaluate the variable influences affecting the valve failure to operate and identify the root cause very quickly.

BACKGROUND: ENERTECH acquired the rights to the BIF product line in May 1988. Prior to that ENERTECH had acted as the authorized sales representative for the BIF Valve line. In 1987 ENERTECH and Duke began a joint study to investigate changes in resilient seat materials. The study analyzed valve seat material used in BIF Valves and looked at the changes that occur over time in resilient material properties. Laboratory tests were conducted by National Testing Systems on Buna-N seat material removed from valves which had been in service and on new unused material.

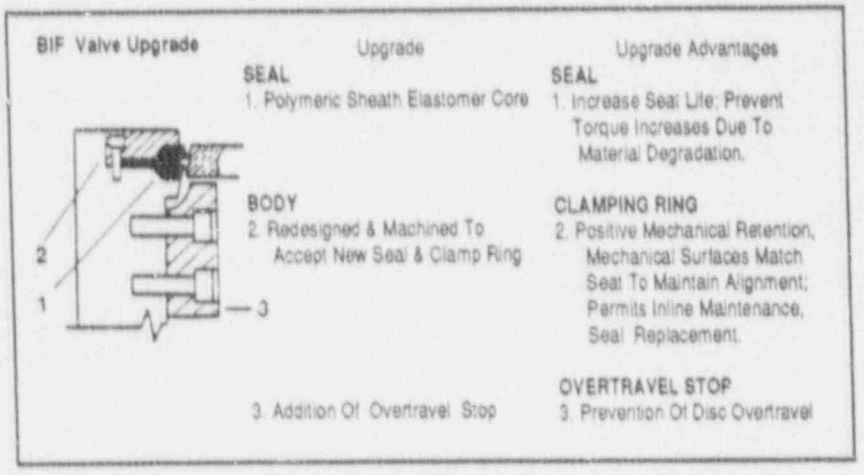
The study analyzed the mode of change of the used material in terms of thermal and oxidation induced degradation. After extensive review, it was determined that the degradation in the sample of used material was due to thermal aging. Results indicated that thermal aging of Buna-N seat material can cause changes to the material's elastic modulus, which in turn may increase the torque required to operate the valve over an extended period of time.

In June of 1988 a joint meeting was held between Duke, ENERTECH and National Testing System to evaluate test data. As a result, additional analysis was performed and, in September of 1988 ENERTECH recommended material and design changes be made to improve operation and reliability of BIF Valves for the Duke application.

Consideration was also given to a new seat design, which utilized a mechanical retained seat in lieu of a bonded seat. The agreed upon solution for this specific application was to change to a polymeric sheath elastomer core seat seal mechanically retained in the valve body. Body design changes were adapted which incorporated a mechanical retained seat to enchance the seal retention and to simplify future in-line maintenance. The material chosen for the upgrade and the seat retention modification are illustrated below. As a result of this failure analysis study, Duke Power and ENERTECH modified two 8"and 16" service water valves.

Operating power plants which have had resilient seated valves in service for long periods of time should inspect them for thermal aging and physical integrity. ENERTECH recommends inspection and, if necessary, change out of resilient seat materials during regular outage periods.

ENERTECH's engineering staff can offer material changes and design modifications to improve service life and reduce maintenance while increasing BIF valve reliability. Each valve style and actual service conditions must be evaluated in terms of individual applications for the correct material utilization and service recommendations.



ENERTECH 2950 Birch Street, Brea, CA 92621 (714)528-2301 FAX(714)528-0128 Telex 69-2387