



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING THE INTEGRITY OF MAIN STEAM
ISOLATION VALVES DURING ACCIDENT CONDITIONS

YANKEE ATOMIC ELECTRIC COMPANY

YANKEE NUCLEAR POWER STATION (YANKEE-ROWE)

DOCKET NO. 50-29

Introduction

Adverse operating experience concerning main steam isolation valves (MSIV's) has been reported to the Office of Inspection and Enforcement (OI&E) following operational tests and spurious closures at various pressurized water reactor (PWR) stations over an extended period of time. In an effort to gain a better understanding of these events, Information Request No. 74-2 was sent to all PWR stations by OI&E. The information thus obtained was used as input to a generic study conducted by the Office of Nuclear Reactor Regulation (NRR). During our review, we had the benefit of discussions with personnel representing various valve manufacturers and with utility representatives whose facilities were affected.

Our concern was the ability of specific types of MSIV's to withstand the dynamic forces associated with rapid closure in the event of a steam line rupture. As a result of this generic study, it was determined that in some cases there may be a need to upgrade both the materials and the design of the MSIV's in order to prevent degradation during normal service and to assure performance of all design safety functions.

Therefore, the Nuclear Regulatory Commission (NRC) requested a number of licensees of PWR's to supply summary information on the analyses or tests performed to confirm the ability of the MSIV's to withstand the forces associated with rapid closure under postulated steam line break conditions. On May 13, June 12, 1975, and April 29, 1976, we requested Yankee Atomic Electric Company (the licensee) to submit information on the angle non-return valves of the lift-check type installed at Yankee-Rowe.

By letters dated May 23, July 24, October 20, 1975, and May 10, 1976, the licensee responded to our requests. Our evaluation of this information, relative to the concerns of MSIV performance under postulated main steam line break conditions and degradation of valves during normal service, is summarized below.

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Evaluation

The licensee has used an elastic analysis to determine the deflections and energy absorption of the main steam check valve disc and stem at the onset of yielding. As this analysis indicated that the seat would begin to yield plastically well before the disc, a scale model of the seat was prepared to determine the energy absorption capabilities of the seat when subjected to plastic deformation.

The results of the scale model testing indicate that the seat will undergo extensive plastic deformation and that this deformation occurs in such a way as to absorb the impact energy without loss of flow stopping capability. Therefore, the licensee made no changes to the main steam check valves.

Conclusion

Based on our review, we have concluded that the combination of analysis and scale model testing of the main steam check valve is acceptable, and provides assurance that these valves will perform the intended function when needed.

Date: June 29, 1976