

TECHNICAL EVALUATION REPORT

**PRIMARY COOLANT SYSTEM
PRESSURE ISOLATION VALVES**

TENNESSEE VALLEY AUTHORITY
BROWNS FERRY UNITS 1, 2 & 3

NRC DOCKET NO. 50-259, 50-260, 50-296

NRC TAC NO. 12891, 12892, 12893

NRC CONTRACT NO. NRC-03-79-118

FRC PROJECT C5257

FRC TASK 226
227
228

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July 21, 1980

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1.0 INTRODUCTION

The NRC staff has determined that certain isolation valve configurations in systems connecting the high-pressure Primary Coolant System (PCS) to lower-pressure systems extending outside containment are potentially significant contributors to an intersystem loss-of-coolant accident (LOCA). Such configurations have been found to represent a significant factor in the risk computed for core melt accidents. The sequence of events leading to the core melt is initiated by the failure of two in-series check valves to function as a pressure isolation barrier between the high-pressure PCS and a lower-pressure system extending beyond containment. This causes an overpressurization and rupture of the low-pressure system, which results in a LOCA that bypasses containment.

The NRC has determined that the probability of failure of these check valves as a pressure isolation barrier can be significantly reduced, if the pressure at each valve is continuously monitored, or if each valve is periodically inspected by leakage testing, ultrasonic examination, or radiographic inspection. NRC has established a program to provide increased assurance that such multiple isolation barriers are in place in all operating Light Water Reactor plants designated DOR Generic Implementation Activity B-45.

In a generic letter of February 23, 1980, the NRC requested all licensees to identify the following valve configurations which may exist in any of their plant systems communicating with the PCS: 1) two check valves in series or 2) two check valves in series with a motor-operated valve (MOV). For plants in which valve configurations of concern were found to exist, licensees were further requested to indicate: 1) whether, to ensure integrity, continuous surveillance or periodic testing was currently being conducted, 2) whether any valves of concern were known to lack integrity, and 3) whether plant procedures should be revised or plant modifications be made to increase reliability.

Franklin Research Center (FRC) was requested by the NRC to provide technical assistance to NRC's B-45 activity by reviewing each licensee's submittal against criteria provided by the NRC and verifying the licensee's reported findings from plant system drawings. This report documents FRC's technical review.

2.0 CRITERIA

2.1 Identification Criteria

For a piping system to have a valve configuration of concern, the following five items must be fulfilled:

- 1) The high-pressure system must be connected to the Primary Coolant System;
- 2) there must be a high-pressure/low-pressure interface present in the line;
- 3) this same piping must eventually lead outside containment;
- 4) the line must have one of the valve configurations shown in Figure 1; and
- 5) the pipe line must have a diameter greater than 1-inch.

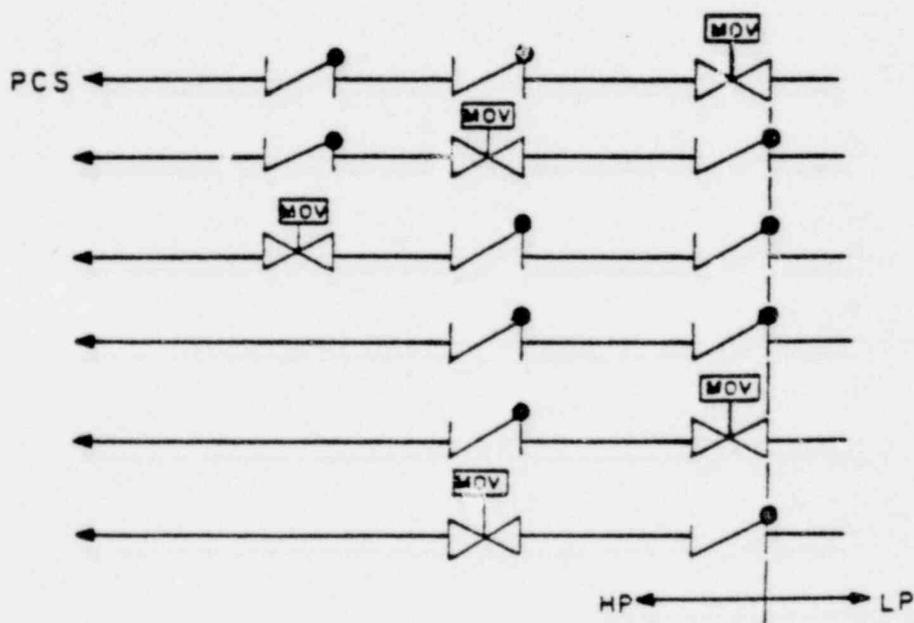


Figure 1. Valve Configurations Designated by NRC to be Included in This Technical Evaluation

3.0 TECHNICAL EVALUATION

FRC has reviewed the response [Ref. 2] of the Tennessee Valley Authority (TVA) to NRC's generic letter [Ref. 1] concerning the issue of PCS pressure isolation valve configurations for Browns Ferry Nuclear Plant, Units 1, 2 & 3.

The licensee stated that none of their piping systems have any of the valve configurations of concern, as described by the identification criteria.

FRC independently checked the plant Piping and Instrumentation Diagrams (P&IDs) [Ref. 3] for piping systems that might have these valve configurations. In this review of the licensee's response against the P&IDs and the identification criteria, FRC found no valve configurations of concern, thus verifying TVA's findings.

4.0 CONCLUSIONS

In TVA's Browns Ferry Nuclear Plant, Units 1, 2 & 3, all piping systems larger than 1-inch diameter that are interconnected to the PCS are free of the valve configurations of concern. Therefore, no further modifications to this plant's Technical Specifications are necessary on this account.

5.0 REFERENCES

- [1]. Generic NRC letter, dated 2/23/80, from Mr. D. G. Eisenhut, Department of Operating Reactors (DOR), to Mr. L. M. Mills, Tennessee Valley Authority (TVA).
- [2]. Tennessee Valley Authority response to the generic NRC letter, dated 3/14/80, from Mr. L. M. Mills (TVA) to Mr. D. G. Eisenhut (DOR).
- [3]. List of examined P&IDs:

General Electric Drawing:

728E900

Browns Ferry Nuclear Plant FSAR:

Figure 4.9-3

Tennessee Valley Authority Drawing:

47W811-1 (Rev. 16)
47W812-1 (Rev. 14)
47W813-1 (Rev. 11)
47W814-1 (Rev. 15)
47W817-1 (Rev. 13)
47W854-1 (Rev. 5)