

**REFERENCE 2**

**(SPECIAL SAFETY VALVE STUDY)**

**SPECIAL STUDY**

**PWR PRESSURIZER SAFETY VALVES AND  
MAIN STEAM SAFETY VALVES AND  
BWR SAFETY/RELIEF VALVES PERFORMANCE**

**DECEMBER 1998**

**Prepared By:**  
**James R. Houghton**

## 4. RESULTS

### 4.1 Failure Probabilities

The Bayes 90% intervals were determined for the 73 PWR plants with the PSVs in the RCS system and MSSVs in the MS system and the 36 BWR plants with SRVs in the MS system. Only FO and FC mode failures were used, as the former could result in an overpressure condition, while the latter could result in a small or medium break LOCA, thus affecting the core damage frequency (CDF) determination (see Appendix I, Tables I - V).

**NOTE:** OR mode failures (the large majority of failures) do not affect CDF determination and are, therefore, not included in failure rate determination.

For PWR PSVs in the RCS system, there were no FO failures and only two FC failures during the ten year period. The Bayes 90% interval mean probability of failure on demand for the FC failure mode (**3.0E-3**) was approximately the same as the generic mean value (3.6E-3/demand, Reference 5).

For PWR MSSVs in the MS system, there were two FO failures and two FC failures during the ten year period. The Bayes 90% interval mean probability of failure on demand for the FO failure mode (**4.4E-4**) was lower than the generic mean value (3.6E-3, Reference 5) and the FC failure (**4.4E-4**) was also lower than the generic mean value (7.2E-4, Reference 5).

For SRVs in the BWR MS system, there were 20 FO failures and 7 FC failures during the ten year period. The Bayes 90% interval mean probability of failure on demand for the FO failure mode (**1.0E-2**) was approximately the same as the generic mean for "Failure to Open on Actuation" for BWR SRVs (1E-2/demand, Reference 3) and the mean probability of failure on demand for the FC failure mode (**3.7E-3**) was lower than the generic mean value for "Failure to Reclose on Pressure Relief" for BWR SRVs (1.6E-2/demand, Reference 3).