

12. Containment Design Perspectives

For seven of the PWR units (four submittals) the containments are kept at an internal pressure that is somewhat below atmospheric pressure. All of these containments rely on structural strength and large internal volume to maintain containment integrity during an accident.

12.3.1.1 Summary of Results and Perspectives for PWR Large Dry and Subatmospheric Containments

The IPE reported values of conditional containment failure probability for this group are shown in Figure 12.23 while containment failure frequencies are shown in Figure 12.24.

The containment failure modes in Figure 12.23 and 12.24 are grouped into early failure, containment bypass, and late failure. The early failure category includes both isolation failure and containment failure before and shortly after vessel breach. The bypass category includes ISLOCA, SGTR, and temperature-induced SGTR. The late containment failure category includes containment overpressure or overtemperature failure and basemat melt-through.

The average conditional probability for the group is 0.05 for early failure, 0.07 for containment bypass, and 0.3 for late failure. On average there is a 0.6 conditional probability for no containment failure. Distributions of the various containment failure modes for the 38 IPEs show significant spread in the data from the IPEs. For example, the conditional probability varies from negligible to over 0.3 for early failure, from negligible to over 0.4 for containment bypass, and from negligible to over 0.7 for late containment failure.

Figure 12.24 indicates that the early failure frequencies reported range from $2E-8/ry$ to $5E-5/ry$, frequency of containment bypass, which is primarily established via the CDF analysis, varies from negligible to almost $4E-5/ry$, and late failure frequencies range from negligible to $3E-4/ry$.

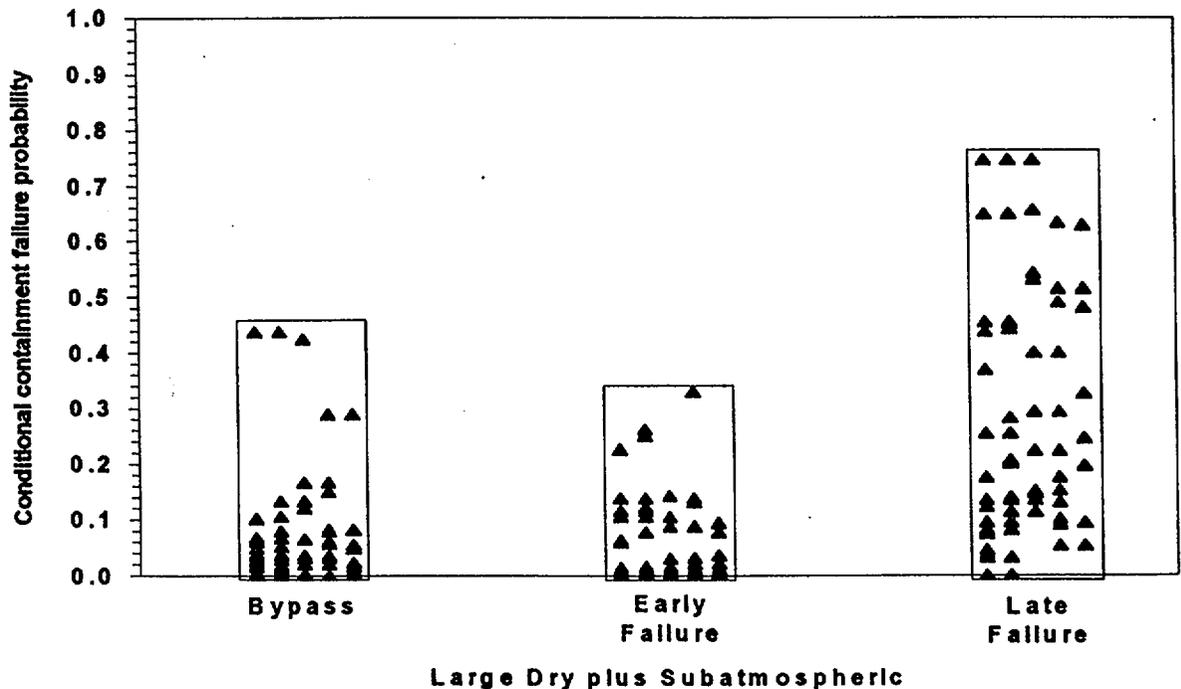


Figure 12.23 Reported IPE CCFPs for PWRs in large dry and subatmospheric containments.