

strategy is to monitor and restore component functions once they are identified through the corrective action program or the periodic feedback process. Similarly, requirements for Type B testing of certain penetrations would not be required. The relief from testing is limited to components meeting specified criteria such that acceptable results for large early release and defense-in-depth are maintained.

#### III.4.7.1 Types of Tests Required by Appendix J

Appendix J testing is divided into three types: Type A, Type B, and Type C. Type A tests are intended to measure the primary reactor containment overall integrated leakage rate after the containment has been completed and is ready for operation, and at periodic intervals thereafter. Type B tests are intended to detect local leaks and to measure leakage across each pressure-containing or leakage-limiting boundary. Primary reactor containment penetrations required to be Type B tested are identified in Appendix J. Type C tests are intended to measure containment isolation valve leakage rates. The containment isolation valves required to be Type C tested are identified in Appendix J.

#### III.4.7.2 Reduction in Scope for Appendix J Testing

*Type A Testing:* The Commission concludes that Type A testing should continue to be required as described in Appendix J.

*Type B Testing:* The Commission concludes that Type B testing should continue to be required for air lock door seals, including door operating mechanism penetrations which are part of the containment pressure boundary and doors with resilient seals or gaskets except for seal-welded doors. Type B testing is not necessary for other penetrations that are determined to be of low safety significance and that meet one or both of the following criteria:

1. Penetrations pressurized with the pressure being continuously monitored.
2. Penetrations less than 1 inch in equivalent diameter.

*Type C Testing:* The Commission concludes that Type C testing is not necessary for valves that are determined to be of low safety significance and that meet one or more of the following criteria:

1. The valve is required to be open under accident conditions to prevent or mitigate core damage events.
2. The valve is normally closed and in a physically closed, water filled system.
3. The valve is in a physically closed system whose piping pressure rating

exceeds the containment design pressure rating and that is not connected to the reactor coolant pressure boundary.

4. The valve size is 1-inch nominal pipe size or less.

#### III.4.7.3 Basis for Reduction of Scope

The first criterion for Type B testing deals with penetrations that are pressurized with the pressures in the penetrations being continuously monitored by licensees. The pressurization itself establishes a leak tight barrier, for such penetrations. The monitoring of the pressures in the penetrations, in conjunction with the proposed requirements for RISC 3 SSCs (including taking corrective action when an SSC fails) provide sufficient assurance, without the need for Type B testing, to ensure that these penetrations are functional.

The second criterion for reducing the scope of Type B testing (*i.e.*, penetrations less than 1 inch in equivalent diameter) is essentially the same as the fifth criterion for reducing the scope of Type C testing (*i.e.*, valve size is 1-inch or less). By definition penetrations of this size do not contribute to large early release.

The Commission finds that these criteria for reducing the scope of the Type C testing requirements are reasonable in that, even without Type C testing, the probability of significant leakage during an accident (that is, leakage to the extent that public health and safety is affected) is small. This is true even though some of the valves that satisfy these criteria may be fairly large.

Appendix J to 10 CFR part 50 deals only with leakage rate testing of the primary reactor containment and its penetrations. It assumes that containment isolation valves are in their safe position. No failure is assumed that would cause the containment isolation valves to be open when they are supposed to be closed. The valve would be open if needed to transmit fluid into or out of containment to mitigate an accident or closed if not needed for this purpose. For purposes of this evaluation, if a valve is open, it is assumed to be capable of being closed. Testing to ensure the capability of containment isolation valves to reach their safe position is not within the scope of Appendix J, and as such is not within the scope of this evaluation. Therefore, the valves addressed by this evaluation are considered to be closed, but may be leaking. The increase in risk due to this proposed revision affecting Appendix J is negligible.

Past studies (*e.g.*, NUREG-1150, "Severe Accident Risks: An Assessment

for Five U.S. Nuclear Power Plants; Final Summary Report," dated December 1990) show that the overall reactor accident risks are not sensitive to variations in containment leakage rate. This is because reactor accident risk is dominated by accident scenarios in which the containment either fails or is bypassed. These very low probability scenarios dominate predicted accident risks due to their high consequences.

The Commission examined in more detail the effect of containment leakage on risk as part of the Appendix J to 10 CFR Part 50, Option B, rulemaking. The results of these studies are applicable to this evaluation. NUREG-1493, "Performance-Based Containment Leak-Test Program," dated September 1995, calculated the containment leakage necessary to cause a significant increase in risk and found that the leakage rate must typically be approximately 100 times the Technical Specification leak rate,  $L_a$ . It is improbable that even the leakage of multiple valves in the categories under consideration would exceed this amount. Operating experience shows that most measured leaks are much less than 100 times  $L_a$ . A more direct estimate of the increase in risk for the proposed revision to Appendix J can be obtained from the Electric Power Research Institute (EPRI) report TR-104285, "Risk Impact Assessment of Revised Containment Leak Rate Testing Intervals," dated August 1994. This report examined the change in the baseline risk (as determined by a plant's IPE risk assessment) due to extending the leakage rate test intervals. For the pressurized water reactor (PWR) large dry containment examined in the EPRI report, for example, the percent increase in baseline risk from extending the Type C test interval from 2 years to 10 years was less than 0.1 percent. While this result was for a test interval of 10 years vs. the current proposal to do no more Type C testing of the subject valves for the life of a plant, the analysis may reasonably apply to this situation because it contains several conservative assumptions which offset the 10-year time interval. These assumptions include the following:

1. The study used leakage rate data from operating plants. Any leakage over the plant's administrative leakage limit was considered a leakage failure. An administrative limit is a utility's internal limit and does not imply violation of any Appendix J limits. Therefore, the probability of a leakage failure is overestimated.
2. Failure of one valve to meet the administrative limit does not imply that the penetration would leak because