Revised RAI 6.2-90 Supplement

RAI 6.2-90 and the applicant's response are reproduced below.

Original RAI 6.2-90

> DCD Tier 2, Section 6.2.6.3, "Containment Isolation Valve Leakage Rate Test (Type C)," states that, for the flowmeter method, water may be used as a test medium for Type C tests, "if applicable."
>
> Option A, section III.C.2.(a), "Test Pressure," states: "Valves, unless pressurized with fluid (e.g., water, nitrogen) from a seal system, shall be pressurized with air or nitrogen at a pressure of Pa. "
>
> Option B, section III.B., begins: "Type B pneumatic tests... and Type C pneumatic tests ...." Applicable guidance is in ANSI/ANS-56.8-1994, section 3.3.5, "Test Medium, " which states, in part, "Type B and Type C tests shall be conducted with air or nitrogen."
>
> The leakage rate tests for containment isolation valves (CIVs) served by seal systems are not Type C tests per se and are addressed in RAI 6.2-91.
>
> Delete the option for water as a Type C test medium from the DCD.

GE's Response

> As per 10 CFR 50 Appendix J, III.C.2.(b), testing of CIVs served by seal system are Type C tests. Testing some CIVs with water as a test medium is appropriate for a CIV that may be justified equivalent to a valve served by a seal system. Always applying Section III.C.2.(a) to all systems penetrating the containment could result in putting the plant in a less safe condition, and would not always ensure that post-accident leakage would be minimized. For example, the Reactor Water Cleanup/Shutdown Cooling (RWCU/SDC) system has two independent trains for (a) maintaining reactor water purification during plant operations and (b) providing nonsafety-related reactor shutdown cooling. Unlike testing with water, testing its CIVs with nitrogen requires that a shutdown cooling train to be taken out-of-service, and thus, it would not be available if a malfunction occurred in the other shutdown cooling train. Therefore, applying Section III.C.2.(a) would reduce shutdown cooling function redundancy, and thus, would put the plant in a less safe condition. Plus, the RWCU/SDC system is kept filled with water, and is designed and maintained for operation at the full reactor power pressure condition has a closed loop outside containment, and thus, its design pressure is about 20 times the post-accident containment pressure. Therefore, any post-accident CIV leakage would still be contained within RWCU/SDC system.
>
> The DCD Tier 2, Section 6.2.6.3 second paragraph, second to last sentence is revised as shown in Attachment A.

Staff Followup

The applicant's response begins by citing Appendix J, but the citation is from Option A of Appendix J and does not apply to Option B. The staff anticipates that all new reactors will

choose to comply with Option B for all types of containment leakage rate tests (Types A, B, and C) due to Option B's less-restrictive requirements and longer test intervals. This makes Option A-based arguments of limited value. Even within Option A, the applicant's position is debatable.

An additional significant problem with the applicant's position is that both Options of Appendix J require that the sum of all Type B and Type C leakage rates shall be less than a specified acceptance criterion. Liquid-based leakage rates cannot be directly summed with gas-based leakage rates due to the different units of measurement. The liquid-based leakage rates must first be converted to gas-based leakage rates, and the staff's long-standing position is that useable conversions from liquid-based leakage rates to gas-based leakage rates are not technically possible.

A. Clarify in the DCD that "Type C" means testing with air or nitrogen and eliminate water as an allowed Type C test medium.

B. For Options A or B, address the testing of the CIVs in systems such as RWCU/SDC under the requirements for seal systems.

- For Option B, an alternate or additional approach is to use the provision in NEI 94-01, Rev. 0, section 6.0, which states that no tests are required for containment boundaries (including CIVs) which do not constitute potential containment atmospheric leakage pathways during and following a design basis accident.