
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 357-8344
SRP Section: 06.02.04 – Containment Isolation system
Application Section: 6.2.4
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Question No. 06.02.04-3

Clarify design requirements for relief valves used as containment isolation barriers.

Per ANSI N271-1976 Section 4.74 (endorsed by RG 1.141), when relief valves that discharge into containment are also used for containment isolation barriers, the discharge side of the valve should be designed to withstand and be tested at the containment design pressure.

The two shutdown cooling system (SCS) pump suction lines (Table 6.2.4-1, Sheet 4, item #18 and 19) rely on relief valves for such purpose. Pursuant to the guidance in Sections 3.6.6 and 4.74 of ANSI N271-1976, state in the DCD that the discharge side of the relief valves in the SCS pump suction lines are designed to withstand and be tested at the containment design pressure.

Response

The relief valves in the two shutdown cooling(SC) pump suction lines (Table 6.2.4-1, Sheet 4, item #18 and 19) protect the SCS from over-pressurization and also serve as containment isolation valves in the backflow direction. The normal relief valve flow is discharged to the in-containment refueling water storage tank(IRWST). The discharge side of the relief valves in SC pump suction lines is designed to be 200 psig, which is greater than the containment design pressure, and will be tested at a pressure greater than the containment design pressure.

DCD Tier 2 Section 6.2.4 is revised to reflect the requirements in Sections 3.6.6 and 4.74 of ANSI N271-1976.

Impact on DCD

DCD Tier 2, Section 6.2.4.1.2 will be revised, as indicated in the attachment associated with this response.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical or Environmental Report.

APR1400 DCD TIER 2

The discharge side of the relief valves in the shutdown cooling pump suction lines is designed to withstand and will be tested at a pressure greater than the containment design pressure.

- a. The containment isolation valves and interconnecting piping are designed and constructed to safety Class 2 and seismic Category I standards as defined in NRC RG 1.29 (Reference 27), respectively.
- b. The design pressure and temperature of all piping and connected equipment comprising the isolated boundary is greater than the design pressure and temperature of the containment. Relief valves for providing overpressure protection from heat up between closed containment isolation valves have a relief set point equal to the design pressure of the piping.
- c. The containment isolation valves and interconnecting piping are protected against missiles.
- d. Containment isolation valves and interconnecting piping are protected against the effects of pipe whip and jet impingement.
- e. Containment isolation valves are designed to operate under normal environmental conditions and to fulfill their safety-related function under post-accident environmental conditions, consistent with the requirements of Section 3.11.
- f. Containment isolation valve and associated penetration piping are qualified in the ASME Section III as Class 2 components, as described in Subsection 3.9.3, and are qualified in accordance with NRC RG 1.26 (Reference 28).
- g. Maximum allowable actuation times are imposed on containment isolation valves consistent with their required safety function. Valve closure time is established based on system considerations, but all valves stroke to their designated position as soon as practicable upon actuation. Power-operated valves of 90.0 mm (3.5 in) to 300.0 mm (12 in) in diameter are closed at least within a time determined by dividing the nominal valve diameter by per minute. Valves of 80.0 mm (3 in) and less generally close within 15 seconds. All valves larger than 300.0 mm (12 in) in diameter close within on minute unless an accident radiation dose calculation is performed to show under accident conditions that the longer closure times do not result in radiation releases significant enough that accident dose allowances are exceeded.