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.:	**41-7957**
SRP Section:	**03.06.02 – Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping**
Application Section:	**3.6.2**
Date of RAI Issue:	**06/18/2015**

Question No. 03.06.02-1

DCD Tier 2 Subsection 14.3.2.3 states that the scope of the graded approach for Class 2 and 3 piping includes main steam and main feed water piping located inside containment. However, it should be noted that in order to enable technically justified decoupling of postulated pipe break effects in completing analyses to demonstrate compliance with GDC 4, the analyses for main steam and main feedwater lines should extend to the first anchor beyond the outboard isolation valve that designates a Class break. At a public meeting on April 14-15, 2015, the applicant indicated that the analyses would in fact be extended to this location. Therefore, the applicant should revise the DCD discussion for consistency with its previous presentation, or justify the exclusion of this portion of main steam and main feedwater lines from the graded approach.

Response

The piping stress and hazard analyses for main steam and main feedwater lines outside containment are based on the graded approach and are extended to the first anchor beyond the outboard isolation valves in the main steam valve house (MSVH). The DCD Tier 2, subsection 14.3.2.3 will be revised to state clearly the scope of the analysis for piping outside containment. The response to RAI 35-7955 Question 03.12-1, (Ref. KHNP submittal MKD/NW-15-0422L dated January 4, 2016), proposes a DCD change that also addresses the main steam and main feedwater analysis to the first anchor and is considered adequate for the changes necessary as a result of this response.

Impact on DCD

DCD Tier 2, Subsection 14.3.2.3 will be revised as indicated in the attached markup as provided in response to RAI 35-7955 Question 03.12-1.

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.

14.3.2.3 ITAAC for Piping Systems and Components

Section 2.3 of Tier 1 involves piping system and components and includes treatment of motor-operated valves (MOVs), power-operated valves (POVs), and check valves as well as dynamic qualification, welding, fasteners, and safety classification of SSCs in accordance with the guidance in NRC RG 1.206 (Reference 1), SRP 14.3 (Reference 2), and SRP 14.3.3 (Reference 5).

The scope of piping systems and components covers piping design criteria, structural integrity, and functional capability of ASME code Class 1,2 and 3 piping systems included in the APR1400 design. A graded approach is taken to the scope of piping systems and components design. More of the ASME code Class 1 piping systems and components are designed than Class 2 and 3 due to their high safety significance. The scope of design for ASME code Class 1 piping includes RCS main loop, pressurizer surge line and two RCS branch line piping, i.e., the direct vessel injection line (12 inch) and shutdown cooling line (16 inch). The other branch line over 2.5 inches includes pressurizer spray line (4 inch). This line is smaller in size and has no significant impact to RCS integrity. Out of the four direct vessel injection lines and the two shutdown cooling lines, which have symmetric arrangements, only one line for each system is analyzed as a representative case. The scope of design for ASME code Class 2 and 3 piping includes main steam and main feedwater piping located inside the containment building. Main steam and main feedwater piping is the largest ASME Class 2 and 3 piping connected to the steam generators and has the highest structural load. The other major Class 2 and 3 piping of concern is SG blowdown piping (4 inch). However, this piping is connected to the SG at around the same elevation as the main feedwater piping (economizer line, 14 inch) and has much less impact to the SG. In addition, the scope includes analysis methods, modeling techniques, pipe stress analysis criteria, pipe support design criteria, high-energy line break criteria, and the leak-before-break (LBB) approach, as applicable to the APR1400 design. Graded approach is also taken to the scope of piping hazards analysis and LBB analysis. Piping hazards analysis includes main steam and main feedwater piping inside the containment building since it is most safety significant in terms of pipe break hazard as well as impact on the RCS structural analysis. LBB analysis includes pressurizer surge line as a representative case in consideration of the thermal stratification expected during the normal operation.

The scope of design for main steam and main feedwater piping outside the containment building covers piping from the containment penetration anchors to the main steam valve house (MSVH) penetration anchors beyond the isolation valves, which are located in the break exclusion area in the auxiliary building.