
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

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

Docket No. 52-046

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SRP Section: 10.3 – Main Steam Supply System
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Question No. 10.03-4

GDC 2 requires that SSCs important to safety are designed to withstand the effects of natural phenomena, such as earthquakes, without loss of the capability to perform their safety function. In addition, SRP 10.3, Section III, item 3 specifies that essential portions of the main steam supply system are designed to quality group B and/or seismic category I requirements.

DCD Tier 1, Section 2.7.1.2, and DCD Tier 2, Section 10.3 state that the safety-related functions of the main steam system (MSS) include overpressure protection of the steam generators and pressure boundary components, and cooldown of the reactor coolant system (RCS) through discharge of steam to the atmosphere. DCD Tier 1, Table 2.7.1.2-1; DCD Tier 2, Table 3.2-1; and DCD Tier 2, Figure 10.3.2-1 identify the discharge piping from the outlet of the main steam atmospheric dump valves (MSADVs) and the main steam safety valves (MSSVs) as seismic category II, quality group D. However, DCD Tier 2, Section 3.2.1 defines seismic category II as an SSC that does not perform a safety-related function and whose continued function is not required.

Designing a piping system to seismic category II precludes a gross structural failure due to seismic activity from interacting with adjacent safety-related SSCs, but does not ensure the piping system itself will remain leak-tight, nor ensures it can continue to accomplish its intended safety function. Because the discharge piping of the MSADVs and MSSVs located in the main steam valve houses (MSVHs) perform the safety-related function of dissipating heat from the RCS and discharging the steam to atmosphere, the staff requests the applicant to revise the classification of this section of piping located in the MSVHs to seismic category I or provide an analysis demonstrating the ability of the MSVH structures to adequately handle the discharged steam from the MSADVs and MSSVs during the most limiting Chapter 15 accident or AOO.

Response

The MSSVs and MSADVs shall perform the safety function to protect overpressure of the steam generator by dissipating heat from the steam generator. However, the discharge piping (vent

stack) from the outlet of MSSVs and MSADVs does not have a safety-related function. It just supplies the flow path to the atmosphere for the discharge of steam from the MSSVs or MAADVs. Also, the discharge piping maintains its structural integrity in the event of SSE.

The main steam safety valve is classified as a seismic category I SSC because it is designed to withstand seismic design basis loads without loss of safety function. However discharge piping (vent stack) is classified as a seismic category II SSC because it is not required for safety, but is structurally designed to withstand safe-shutdown earthquake loads in order to not jeopardize the performance of safety-related components. This means that the MSVH structures are not affected by the failure of the discharge piping because the discharge piping maintains its structural integrity in the event of SSE.

Analysis to determine the maximum pressure and differential pressures acting on the walls, equipment and supports in the MSVH due to the postulated main steam line break was performed. Its results are provided for the design of MSVH wall and components within the compartment. Table 3.11-2 (4 of 5) shows the environmental parameters such as pressure, temperature in the MSVH based on the MSVH compartment analysis due to a postulated high energy line break (MSLB). The compartmental accident pressure due to the MSLB is considered for the MSVH structure design as stated in DCD Tier 2 Subsection 3.8.4.3.2.

Therefore, even though leak from the discharge piping may occur, the MSVH structures will be intact because a pipe leak is smaller than a main steam line break. Also, the MSSVs and MSADVs can accomplish their intended safety functions to protect against overpressure of steam generator.

Impact on DCD

There is no impact on the DCD.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on Technical Specifications.

Impact on Technical/Topical/Environmental Reports

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