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.:	**297-8309**
SRP Section:	**19.03 – Beyond Design Basis External Event**
Application Section:	**19.03**
Date of RAI Issue:	**11/09/2015**

Question No. 19.03 -2

The NRC staff requests that the APR1400 design certification applicant describe the provisions for design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability of all safety-related installed pumps, valves, and dynamic restraints to perform their intended functions as part of the mitigation strategies (including initial full-power operation and mid-loop operation) to ensure core cooling, containment function, and spent fuel pool cooling capabilities during an extended loss of ac power event at an APR1400 nuclear power plant. As part of this request, the applicant should indicate whether any safety-related pumps, valves, and dynamic restraints used as part of the mitigation strategies for an extended loss of ac power event will have performance requirements that exceed their original safety-related design and performance specification (such as pumps used with reduced net positive suction head available, and safety or relief valves used to support feed and bleed conditions). In addition, the applicant should indicate where the APR1400 DCD Tier 2 specifies the provisions for the design, manufacture, testing, installation, and surveillance for the safety-related pumps, valves, and dynamic restraints that perform functions as part of the mitigation strategies, or provide proposed modifications to the APR1400 DCD Tier 2 to incorporate these provisions.

Response - (Rev. 1)

The safety-related installed pumps and valves perform their intended functions as part of the mitigation strategies to ensure core cooling, containment function, and spent fuel pool cooling capabilities during a BDBEE are listed in Table 6-2 of Technical Report, Evaluations and Design Enhancements to Incorporate Lessons Learned from Fukushima Daichi Nuclear Accident, (APR1400-E-P-NR-14005-P/NP). Table 6-2 will be added to the Technical Report through the response for RAI 297-8309 Question 19.03-1, Item (a).

The installed safety-related pumps and valves, except for turbine driven auxiliary feedwater pump (TDAFWP), auxiliary charging pump (ACP), main steam safety valve (MSSV), and main steam atmospheric dump valve (MSADV), are utilized to lead the plant to cold shutdown condition during phase 3 of the BDBEE mitigation strategies when 4.16 kV mobile generator and ultimate heat sink are available. Since the shutdown operation to the cold shutdown is started only when RCS is within appropriate conditions that do not exceed the design conditions for the safety-related equipment, the performance requirements for the safety-related pumps and valves for the BDBEE mitigation strategies are bounded by the performance requirements of the original APR1400 design basis and performance specifications for these pumps and valves.

The ACP, TDAFWP, MSSV, and MSADV are utilized for the core cooling in phase 1 (TDAFWP and MSSV) and phase 2 (ACP, TDAFWP, and MSADV) of the BDBEE mitigation strategies when a BDBEE occurs at a plant operation mode with steam generator (SG) available. In the basic core cooling strategy using these pumps and valves, the RCS is cooled down to and maintained at the hot shutdown condition which is within the design conditions for the pumps and valves. However, if ACP and TDAFWP are not available, when room temperature for each pump exceeds an available temperature for pump operation based on heatup calculations, the function of ACP (RCS makeup) is carried out by primary side high-head FLEX pump, and the function of TDAFWP (feedwater supply to SG) is provided by secondary side FLEX pump. Therefore, the performance requirements for the ACP, TDAFWP, MSSV, and MSADV for the BDBEE mitigation strategies are bounded by the performance requirements of the original APR1400 design basis and performance specifications for these pumps and valves.

Provisions for the design, manufacture, testing, installation, and surveillance to provide assurance of the seismic, environmental, and functional capability of the safety-related installed pumps and valves are described in Table 6-2 of Technical Report APR1400-E-P-NR-14005-P/NP. This report also provides cross references to the respective DCD Tier 2 sections for the provisions of design, manufacture, testing, installation, and surveillance of safety related pumps and valves.

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 the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on the Technical Report.