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.:	**98-8051**
SRP Section:	**09.01.02 - New and Spent Fuel Storage**
Application Section:	**9.1.2**
Date of RAI Issue:	**07/22/2015**

Question No. 09.01.02-8

GDC 61 requires that the fuel storage system be designed for adequate safety under anticipated operating and accident conditions. The fuel storage system must be designed with (1) the capability for appropriate periodic inspection and testing of components important to safety, (2) suitable shielding for radiation prote]ction, (3) appropriate containment, confinement, and filtering capability, (4) residual heat removal that reflects the safety importance of decay heat and other residual heat removal, and (5) the capability to prevent a significant reduction in fuel storage coolant inventory under accident conditions.

SRP Section 9.1.2.III.2.H.i states that the spent fuel pool (SFP) design should include weirs and gates separating the spent fuel storage areas from handling areas to prevent the accidental draining of the coolant to levels inadequate for fuel cooling or radiation shielding. The bottoms of any gates should be above the top of the fuel assemblies, and the volume of the adjacent fuel-handling areas should be limited so that leakage into these areas while drained would not reduce the coolant inventory to less than 3 meters (10 feet) above the top of the fuel assemblies. The staff determined that the applicant's description of the SFP does not address all the design criteria identified in SRP Section 9.1.2.III.2.H.i.

The staff requests the applicant to discuss in the DCD the (sizing) volume of the adjacent fuel-handling areas, such that the leakage into these areas while drained would not reduce the coolant inventory to less than 3 meters (10 feet) above the top of the fuel assemblies.

Response

Two single seismic Category I gates are installed at the openings of the fuel transfer canal and the cask loading pit, respectively. The spent fuel pool (SFP) water level is calculated assuming that the single gate is open between the SFP and the fuel transfer canal having a larger volume than the cask loading pit.

As described in response to 09.01.02-5, the draining operation in the adjacent fuel-handling areas such as fuel transfer canal and cask loading pit can be terminated in the event of a failure of a single gate. The SFP water level after the event can be calculated by the following equation.

Security-Related Information – Withhold Under 10 CFR 2.390

Therefore, the SFP design complies with the minimum water level requirement of the SRP 9.1.2.III.2.H.i in the event of a single gate failure.

Impact on DCD

DCD Tier 2 Section 9.1.2.2.2, Page 9.1-12, will be revised as indicated on the attached markup.

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.

including related connections to the SFP is described in Subsection 9.1.3. Each area can be sealed from its adjacent area by a hinged gate equipped with elastomer seals. The gates are designed as seismic Category I and allow the spent fuel cask loading pit and the fuel transfer canal to be drained without affecting the water level in the SFP. The gates are designed to withstand the water pressure in the SFP when the adjacent areas are dewatered.

The fuel transfer canal contains the fuel transfer system that is used for transporting fuel assemblies to and from the containment building. The spent fuel cask loading pit contains the spent fuel cask that is used for the transport of spent fuel assemblies from the fuel storage area in the auxiliary building.

All the preceding areas are stainless-steel-lined and concrete-walled pools that are integral parts of the fuel handling area building structure.

The SFP is approximately 7.31 m (42 ft) deep and made of reinforced concrete lined with stainless steel plate. The SFP is sufficiently deep that when a spent fuel assembly is being carried over the spent fuel storage racks by the spent fuel handling machine (SFHM) at its maximum lift height, there is sufficient water coverage to provide reasonable assurance that personnel on the SFHM or on the operating floor around the pool are not exposed to radiation levels exceeding 0.025 mSv per hour.

reducing the pool water level or

Piping penetrations to the SFP are at least 3.05 m (10 ft) above the top of the fuel assemblies seated in the spent fuel storage racks. The bottom of the gates that lead from the SFP to the fuel transfer canal and the spent fuel cask loading pit are above the top of the stored fuel assemblies. The spent fuel storage racks and the pool floor are designed to withstand the maximum impact energy of a fuel handling tool or a fuel assembly with its handling tool dropped from the maximum lift height. Redundant low- and high-level water alarms and temperature measurement instruments, as described in Subsection 9.1.3.5, minimize the potential for overfilling the pool. The ventilation system for the SFP area is described in Subsection 9.1.3.1.

Pipes that discharge into the spent fuel pool include siphon breaker holes as an anti-siphon device between the normal water level and the level of the SFP pumps' suction connection.

The makeup water to the SFP is provided by a safety Class 3, seismic Category I water supply, as described in Subsection 9.1.3.2.

In addition, the SFP is designed that SFP water leakage to the adjacent fuel handling areas level would not reduce the SFP water level to less than 3.05 m (10 ft) above the top of the stored fuel assemblies in the event of a single gate failure.