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.: **76-8024**

SRP Section: **09.02.05 – Ultimate Heat Sink**

Application Section: **9.2.5.4**

Date of RAI Issue: **07/15/2015**

Question No. 09.02.05-1

GDC 45, “Inspection of Cooling Water System” requires that the cooling water system be designed to permit appropriate periodic inspection of important components and equipment should be provided. SRP Section 9.2.5 identifies the applicability of GDC 45 for the ultimate heat sink (UHS). Further, SRP Section 9.2.5 Subsection II.4 specifically states that UHS should provide design provisions to permit access for inservice inspection of safety-related components and equipment.

DCD Tier 2, Sections 9.2.5.4.1 and 9.2.5.4.2 describe the preoperational and inservice testing and inspection as part of conceptual design information (CDI) in the double bracket [[X]]. Therefore, the adequacy of the design provisions for testing and inspection will be reviewed for COL applications instead of the standard plant design.

The applicant is requested to provide a COL information item so that the site-specific UHS will be required to address the above SRP provisions.

Response

The COL information item 9.2(31) will be revised that the site specific UHS will address the SRP provisions.

Impact on DCD

In DCD Tier 2, Table 1.8-2, subsection 9.2.5.4, and 9.2.10 will be revised as indicated on the Attachment.

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 Reports.

Table 1.8-2 (14 of 29)

Item No.	Description
COL 9.2(23)	The COL applicant is to specify the following UHS chemistry requirements for bio-fouling and chemistry control: a. A chemical injection system to provide non-corrosive, non-scale-forming conditions to limit biological film formation b. The type of biocide, algaecide, pH adjuster, corrosion inhibitor, scale inhibitor, and silt dispersant, if necessary to maintain system performance based on site conditions.
COL 9.2(24)	The COL applicant is to verify the piping layout of the ESWS and UHS to prevent water hammer and develop operating procedures to provide reasonable assurance that the ESWS and UHS water pressure are above saturation conditions for all operating modes.
COL 9.2(25)	The COL applicant is to develop maintenance and testing procedures to monitor debris buildup and flush out and to remove the debris in the UHS.
COL 9.2(26)	The COL applicant is to evaluate the potential wind and recirculation effects of cooling towers based on meteorological condition.
COL 9.2(27)	The COL applicant is to provide the material specifications for piping, valves, and fittings of the UHS system based on site-specific conditions and meteorological conditions.
COL 9.2(28)	The COL applicant is to provide the evaluation of maximum evaporation and other losses based on the site-specific conditions and meteorological conditions in the UHS.
COL 9.2(29)	The COL applicant is to provide the detailed evaluation for UHS capability with consideration of site-specific conditions and meteorological data in the UHS.
COL 9.2(30)	The COL applicant is to provide chemical and blowdown to prevent biofouling and long-term corrosion, considering site water quality in the UHS.
COL 9.2(31)	~~The COL applicant is to provide the inspection and testing of the UHS~~ to demonstrate that fouling and degradation mechanisms applicable to the site are effectively managed to maintain acceptable heat sink performance and integrity.
COL 9.2(32)	The COL applicant is to provide the alarms, instrumentation, and controls required for the safety-related functions of the UHS.
COL 9.2(33)	The COL applicant is to develop the following procedures for the water system: filling, venting, keeping it full, and operating it to minimize the potential for water hammer. The COL applicant is also to analyze the system for water hammer impacts, design the piping system to withstand potential water hammer forces, and analyze inadvertent water hammer events in the ECWS in accordance with NUREG-0927.
COL 9.2(34)	The COL applicant is either to prepare or to include operational procedures and maintenance programs.
COL 9.2(35)	The COL applicant is to maintain complete documentation of system design, construction, design modifications, field changes, and operations.
COL 9.2(36)	The COL applicant is to include a site-wide radiological environmental monitoring program to monitor both the horizontal and vertical variability of the onsite hydrogeology and the potential effects of the construction and operation of the plant.
COL 9.3(1)	The COL applicant is to provide operational procedures and maintenance programs as related to leak detection and contamination control.

The COL applicant is to provide details for the following preoperational and inservice testing and inspection based on type of UHS to be provided. These details include inspection and testing requirements necessary

9.2.5.4 Inspection and Testing Requirements

~~The COL applicant is to provide the inspection and testing of the UHS~~ to demonstrate that fouling and degradation mechanisms applicable to the site are effectively managed to maintain acceptable heat sink performance and integrity (COL 9.2(31)).

9.2.5.4.1 Preoperational Testing and Inspection

[[Preoperational testing of the UHS is performed as described in Section 14.2 to verify that the system is installed in accordance with plans and specifications. The system is hydrostatically tested and functionally tested to verify proper installation and operation of the valves.]]

The COL applicant is to provide details for the following preoperational and inservice testing and inspection based on type of UHS to be provided. These details include inspection and testing requirements necessary

9.2.5.4.2 In-Service Testing and Inspection

[[During normal operation, periodic inspections and tests are performed to verify operability or, alternatively, placed in normal operation in place of the division that has been operating. Descriptions of the testing and inspection programs for valves are provided in Subsection 3.9.6 and Section 6.6.]]

9.2.5.5 Instrumentation Requirements

The COL applicant is to provide the alarms, instrumentation, and controls required for the safety-related functions of the UHS (COL 9.2(32)).

[[Alarms, indications, and controls are provided in the main control room (MCR).]]

9.2.5.5.1 System Monitoring

a. [[UHS cooling tower basin water level]]

b. [[UHS cooling tower water temperature]]

9.2.5.5.2 System Alarms

a. [[UHS cooling tower water level high/low]]

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COL 9.2(32) The COL applicant is to provide the alarms, instrumentation, and controls required for the safety-related functions of the UHS.

COL 9.2(33) The COL applicant is to develop the following procedures for the water system: filling, venting, keeping it full, and operating it to minimize the potential for water hammer. The COL applicant is also to analyze the system for water hammer impacts, design the piping system to withstand

The COL applicant is to provide details for the following preoperational and inservice testing and inspection based on type of UHS to be provided. These details include inspection and testing requirements necessary

COL 9.2 (34) The COL applicant is either to prepare or to include operational procedures and maintenance programs.

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COL 9.2(36) The COL applicant is to include a site-wide radiological environmental monitoring program to monitor both the horizontal and vertical variability of the onsite hydrogeology and the potential effects of the construction and operation of the plant.

9.2.11 References

1. 40 CFR Part 141, “National Primary Drinking Water Regulations,” Environmental Protection Agency.

2. 29 CFR 1910, “Occupational Safety and Health Standard,” Occupational Safety and Health Administration.

3. ASME B31.1-2010, “Power Piping,” The American Society of Mechanical Engineers, 2010.