REVISED 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.:	**225-8254**
SRP Section:	**12.02 – 12.04 – Radiation Protection Design Features**
Application Section:	**12.3 – 12.4**
Date of RAI Issue:	**09/24/2015**

Question No. 12.03-11

10 CFR 20.1406(b) requires that, “Applicants for standard design certifications, standard design approvals, and manufacturing licenses under part 52 of this chapter, whose applications are submitted after August 20, 1997, shall describe in the application how facility design will minimize, to the extent practicable, contamination of the facility and the environment, facilitate eventual decommissioning, and minimize, to the extent practicable, the generation of radioactive waste.”

The application discusses the separate structure in the APR1400 design to for the component cooling water (CCW) heat exchangers that interface with the essential service water system. Staff has the following questions regarding minimization of contamination and this structure.

1. FSAR Section 9.2.2 discusses how leakage in the component cooling water (CCW) structure will be collected by the local sump and routed for treatment. Please indicate in the FSAR where the liquid collected in the sump is routed.

2. For the sump for the CCW structure and all other sumps for which a leak could result in a direct leakage pathway to the environment, please discuss in the FSAR design features to minimize the risk of a leak of radioactive fluid to the environment (such as concrete sealer and/or seals around pipes leading to or from the sump to prevent radioactive material from escaping from the sumps).

Response – (Rev.1)

1. Leakage collected in the local sump inside the CCW structure is equipped with a radiation monitor to detect radiological contamination. Liquid detected with a radiation level above a pre-determined setpoint is routed to the LWMS for treatment and discharge. Non-radioactive liquid is routed to the non-radioactive wastewater treatment facility for treatment and discharge.

It should be noted that the location of the CCW structure is site-specific. The routing of the CCW sump drains can also be combined with other potentially radioactive drains, such as the auxiliary boiler blowdown, for routing consideration with the objective to minimize the number and the length of the drain piping.

The designation of the CCW sump drain routing will be added in DCD Tier 2, Subsection 9.2.2.2.5, Design Objective for Reduction of Cross-Contamination, Decontamination, and Waste Generation, sub-item c, for clarification.

The COL applicant is to provide the flow diagram of CCW heat exchanger building drain system to LWMS or turbine generator building (TGB) sump (COL9.3(5)), which is incorporated into RAI 8326, Question 09.03.03-4.

2. The design features for the CCW drain sump are discussed in DCD Tier 2,Subsection 9.2.2.2.5, Design Objective for Prevention/Minimization of Unintended Contamination, sub-item d as follows:

   "d. Sumps that contain contaminated or potentially contaminated fluid are equipped with stainless steel liners and level switches to initiate pumping when sump levels reach a predetermined setpoint. The sumps are designed to facilitate periodic maintenance and inspection of the epoxy coating."

   These design features are typical for sumps that may contain radioactive or potentially radioactive fluids and are intended to minimize the risk of a leak of contaminated fluid to the environment.

   Based on the above discussion, no change to the DCD is needed.

Impact on DCD

DCD Subsection 9.2.2.2.5, Item c will be revised as indicated in 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 Report.

identification evaluation indicated that the CCWS is designed to facilitate early leak detection and the prompt assessment and response to manage collected fluids. Thus, unintended contamination to the facility and the environment is minimized and/or prevented by the SSC design, supplemented by operational procedures and programs and inspection and maintenance activities.

Prevention/Minimization of Unintended Contamination

a. The system components, including the CCWS surge tanks, pumps, and associated piping, are fabricated from carbon steel material and are of welded construction for life-cycle planning. The CCWS is injected with a corrosion inhibitor, and the surge tanks are covered with nitrogen gas to minimize the oxidation of steel and formation of corrosion. The CCWS heat exchangers are made of titanium, and pump impellers are made of stainless steel. The system design includes periodic sampling and analysis to maintain water quality and provisions for in-service testing and inspection to maintain system integrity. This design approach minimizes leakage and unintended contamination of the facility and the environment.

b. The CCWS surge tanks, heat exchangers, and pumps are designed with multiple divisions and sufficient capacity to accommodate different modes of operation, including normal and anticipated operational occurrences. The tanks are designed to meet ASME III, Division I, and are equipped with dual-level instruments to facilitate control of the content liquid level, thus minimizing the spread of contamination and waste generation.

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c. ~~The facility area that houses the system components, including the equipment cubicles that contain radioactively contaminated or potentially contaminated fluid, are designed with sloped floors with epoxy coating to facilitate the draining of fluid into drain pipes that direct liquid into a local sump. The facility layout facilitates the operators' prompt assessment and fast response when needed.~~

d. Sumps that contain contaminated or potentially contaminated fluid are equipped with stainless steel liners and level switches to initiate pumping when sump levels reach a predetermined setpoint. The sumps are designed to facilitate periodic maintenance and inspection of the epoxy coating.

"A"

The cubicles, where the CCWS SSCs are housed, are designed with sloped floors, epoxy coating to provide drainage and cleanable surfaces, and local sumps to collect leakage and overflows. Radioactive or potentially radioactive liquid collected by the drains in the cubicles of the buildings, except for the CCW heat exchanger building, is to be routed to the nearest drain collection point, and is then transferred to the LWMS or turbine generator building (TGB) sump (COL 9.3(5)) for treatment and release. Liquid collected in the local sump of the CCW heat exchangers building is monitored for radioactive contamination using the radiation monitor. When the liquid is identified as containing radioactive contamination above a predetermined setpoint, the liquid is routed to the LWMS for treatment and release and non-radioactive liquid is routed to the non-radioactive wastewater treatment system for processing and release. Cubicle curbs are also provided to reduce cross-contamination and the spread of contamination to other areas. CCW heat exchangers are located in a separate structure that is close to the essential service water building in order to minimize radiation exposure to the essential service water piping.