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.: **402-8477**

SRP Section: **10.04.01 – Main Condensers**

Application Section: **10.4.1**

Date of RAI Issue: **02/10/2016**

Question No. 10.04.01-5

Title 10 of the Code of Federal Regulations (10 CFR) Part 50, Appendix A, General Design GDC 4 requires, in part, that SSCs important to safety be "appropriately protected against dynamic effects, including…the effects of discharging fluids …" According to Section III, "SRP Review Procedures," Item III.2.A of SRP Section 10.4.1, "Main Condensers," the requirements of GDC 4 are met by providing a means for controlling and correcting cooling water leakage into the condensate. GDC 60 requires, in part, a power unit design to "include means to control suitably the release of radioactive materials in gaseous and liquid effluents … produced during normal reactor operation, including anticipated operating occurrences."

DCD Tier 2, Section 10.4.1.2, "System Description," describes that the main condenser (MC) interfaces with the tube leak detection system to permit sampling of the condensate in the condenser hotwell. The DCD further states that, if circulating water in-leakage occurs, this system permits identification of which tube bundle has sustained leakage. The waterbox is then drained to permit access for repairs by isolating the circulating water system from the affected waterbox of the MC. The tube leak detection system is further described in DCD Tier 2, Section 9.3.2.

While reviewing DCD Tier 2, Section 10.4.1 and the response to RAI 10.4.1-2 dated 10/2/2015, the staff could not find further details on the controlled collection of the waterbox drainage which may contain radioactive contaminants.

The applicant is requested to provide additional information in the DCD as related to the means on the controlled collection of waterbox drainage that may contain radioactive contaminates. The DCD should be revised to include location of the collection point(s) for where the water from the MC waterbox drains are collected and the radiation activity for drain collection is monitored.

Response

The MC waterbox drains are collected into the condenser pit sumps (north/south), which are located in the turbine generator building through piping that is part of the equipment vents and drains system. The drains are monitored and controlled for process radiation through the condenser pit sumps and a condensate polishing area sump.

In addition, Figure 1 shows the interconnection of the turbine generator building sump pumps between the LWMS (Liquid Waste Management System) and the WWTF (Waste Water Treatment Facility). Additional information about the turbine drain system was provided in the response to Question No. 09.03.03-3 and 09.03.03-4.

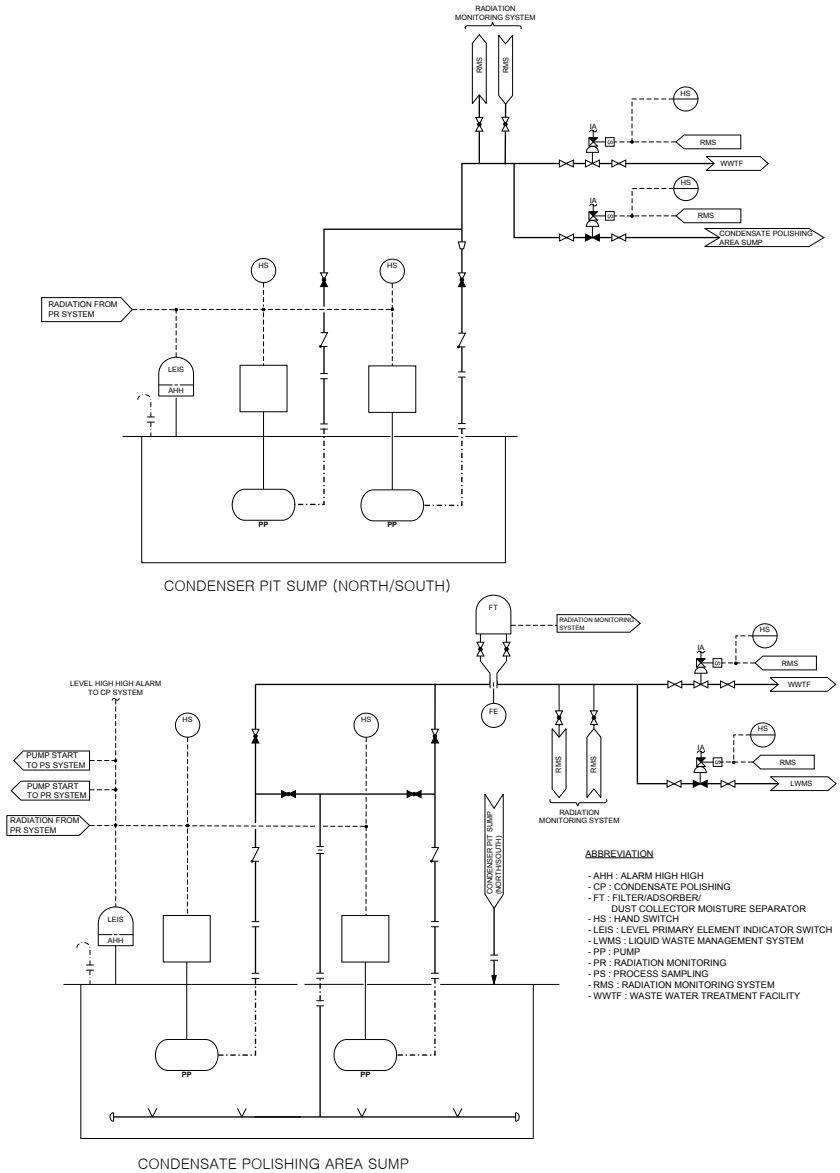

Figure 1 Turbine Generator Building Drain System

Impact on DCD

DCD Tier 2, Subsection 10.4.1 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.

The following functional requirements of the main condenser are met to provide reasonable assurance of a reliable system:

a. The main condenser hotwells serve as storage reservoirs for the condensate and feedwater systems with sufficient volume to supply maximum condensate flow for 5 minutes.

b. The condenser vacuum system in the main condenser is designed to remove leaked air and non-condensable gases from condensing steam. The condenser vacuum system is described in Subsection 10.4.2.

c. The circulating water system (CWS) is routed to each of three condenser shells in a parallel configuration. Heat is removed from the main condenser by the CWS.

d. The condenser tube material is titanium and tube sheets are titanium-clad carbon steel as specified in Table 10.4.1-1, or equivalent material. The titanium material provides good corrosion- and erosion-resisting properties.

e. Condenser design precludes or minimizes steam impingement forces on the condenser tubes for normal operation and turbine bypass valve quick-opening events. Tube support plates are designed to minimize tube vibrations.

into the condenser pit sumps(north/south)through piping that is part of the equipment vents and drains system

f. The tube leak detection system is provided to permit sampling of the condensate in the condenser hotwell as described in Subsection 9.3.2. The tube leak detection system identifies which tube bundle has sustained leakage if circulating water inleakage occurs. The affected condenser hotwell is manually isolated by closing the motor-operated hotwell discharge valve when condenser tube leakage exceeds the design value for the condensate polishing system (CPS). Plant power is reduced as necessary. The waterbox is then drained and the affected tubes are either repaired or plugged.

g. The condenser is designed to deaerate the condensate during startup and normal operation. The design also deaerates any drains that enter the condenser.

The waterbox drains are monitored and controlled for process radiation through the condenser pit sumps and a condensate polishing area sump.