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.:	**396-8463**
SRP Section:	**12.03-12.04 – Radiation Protection Design Features**
Application Section:	**12.3**
Date of RAI Issue:	**02/03/2016**

Question No. 12.03-51

SRP Section 12.3-12.4 indicates that the acceptability of facility design features will be based on evidence that major exposure accumulating functions, such as maintenance, have been considered in the plant design that will keep potential radiation exposure from these activities ALARA. It also states that compliance with 10 CFR 20.1406 requires the applicant to describe how facility design and procedures for operation 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.

This question is a follow-up to RAI 8275, Question 12.03-36.

In the response to Question 12.03-36, the applicant provided a description of the containment sumps and how the sumps meet the above criteria. Please include the following information from that response in the FSAR:

1. Specify that there are a total of two sumps in containment (the containment building drain sump and the ICI cavity sump) and that each sump contains two pumps.

2. Specify that the sumps and sump pumps are designed in order to facilitate repair of the pumps, taking into account maintenance and removal, and that an easy removal path is provided to remove the pumps without obstacles.

3. Specify that the sump area on the floor is designed so that personnel can perform the ingress, egress, equipment laydown/pull, maintenance, and/or decontamination work for the pump and the pump motor without any platform.

4. Specify that the sump areas are epoxy coated to assist in decontamination.

Response

DCD Tier 2, Subsection 9.3.3.2.4.d and 12.3.1.4.a will be revised to include the information from the response to Question 12.03-36 as requested.

Impact on DCD

DCD Tier 2, Subsection 9.3.3.2.4.d and 12.3.1.4.a 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.

Leakage from all reactor containment building floors is directed to the reactor containment building drain sump. The in-core instrumentation (ICI) cavity is also provided with a sump at the lowest point in the reactor containment building. These sumps serve no safety-related function.

The reactor containment building drain sump and the ICI cavity sump are provided with a sump level monitoring system to detect unidentified leakage from the reactor coolant system (RCS).

The sump pump discharge lines penetrating the reactor containment building to the auxiliary building are isolated by one fail-closed air-operated and the one fail-lock motor-operated containment isolation valve (CIV), one inside the reactor containment building and one outside the reactor containment building. These valves close on a containment isolation actuation signal (CIAS). The reactor containment building floor drain piping is a non-safety class piping except for the containment penetration piping and the CIVs, which are safety Class 2.

Reactor coolant quality water from valve and equipment leak-offs, drains, and reliefs within the reactor containment building are collected in the reactor drain tank (RDT). The tank is part of the chemical and volume control system (CVCS) and is described in Subsection 9.3.4.2.

Low-radioactivity condensate from the reactor containment fan cooler (RCFC) and reactor cavity air handling unit (AHU) is routed to and collected in the reactor containment building drain sump.

e. Auxiliary building equipment and floor drains

The auxiliary building floor and equipment drainage system is divided into four separate drainage subsystems. No common floor drain lines are provided between quadrants or divisions.

Each quadrant is provided with a floor drain sump, independent of the sumps serving the other quadrants. Also, each division is provided with an equipment drain sump, independent of the sump serving the other division. The separate

Each sump has two sump pumps. The sumps are designed to facilitate repair of the pumps taking into account maintenance and removal. Sump pump size and pathway width are considered for the equipment removal pathway to allow unobstructed movement through the door, corridor and equipment removal hatch. The sump area on the floor is designed so that personnel can perform the ingress, egress, equipment removal laydown, maintenance and/or decontamination work for the pump and pump motor without the use of any platform. The working area is epoxy coated for ease of area decontamination.

designed to be smaller for more frequent transfer to the LWMS to minimize evaporation and suspension of radioactive particulates inside the reactor containment building.

b. Ventilation

Additional design requirements for the reactor containment building sump and the ICI sump are provided in Subsection 9.3.3.2.4.d.

HVAC systems are provided for individual buildings as part of the APR1400 design. Each HVAC system is designed to provide the proper ventilation flow to remove contaminated gases and vapor to levels below the limits of 10 CFR Part 20, Appendix B, Table 1, and to keep building areas, cubicles, walkways, and control areas in the proper environmental conditions (temperatures and air quality). For maximum efficiency, airflow generally is directed from clean/low-contamination areas to higher-contamination areas at a velocity suitable for minimizing entrainment of moisture and particulate. There is also system redundancy to minimize interruption of continuous operation. Exhausted airflows are processed through high-efficiency particulate air (HEPA) filters, charcoal adsorbers, and monitors for radiological contamination before being discharged into the atmosphere. This design approach provides proper airborne contamination control and meets the requirements of NRC RG 8.8, Position 2.d. HVAC systems are addressed in Subsection 9.4.8.

c. Hot machine shop

This area provides a dedicated area where maintenance can be performed on radioactive and contaminated equipment. The hot machine shop allows for maintenance and repair activities to be performed in a lower-radiation area with plenty of space for workers to facilitate the efficient completion of the maintenance task.

d. Loop seals

Water-filled loop seals are provided in the floor drain system to preclude the flow of contaminated material from one area or floor to another.