
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.: 381-8467
SRP Section: 10.04.08 – Steam Generator Blowdown System
Application Section: 10.04.08
Date of RAI Issue: 02/01/2016

Question No. 10.04.08-5

The staff is unclear on the information that a COL applicant is required to provide for COL Item 10.4(7). FSAR Tier 2 Table 1.8-2 and Subsection 10.4.3.2.3.4 (10.4.8.2.3.4) state that the COL applicant is to describe the system design for the “SG drain.” However, the description in FSAR Subsection 10.4.8 also states that SGBS is used to drain the SG. Therefore, it is the staff’s understanding that the COL applicant is required to describe how the SG will be drained, rather than describing the drain itself. Please clarify this COL information requirement and discuss your plans to revise the FSAR to provide this clarification.

Response

The SGBD system is used to drain the secondary side water of the SGs for maintenance or for a refueling shutdown. In this mode of operation after reactor shutdown, the SG water is analyzed for radioactivity contamination level through the SGBD process radiation monitoring system. The water is normally routed to wastewater treatment facility. When the SG water is detected to contain radioactivity above a pre-determined setpoint, the SG water is routed to the liquid radwaste system for further processing before release.

After completion of the SG drainage, nitrogen gas is used for drying and blanketing the SG. The drying and blanketing operation is to minimize corrosion impacts to the SG after the draining operation. Since the nitrogen system is not part of the standard design certification, the COL applicant is responsible for providing the nitrogen gas, or equivalent, for the protection of the SG.

It is not the intent for the COL applicant to describe how the SG will be drained; rather, the COL applicant is to provide nitrogen gas, or equivalent, for the protection of the SG during the SG draining operation. COL Item 10.4(7) will be revised in accordance with the discussion above.

Impact on DCD

DCD 10.4.8.2.3.4, 10.4.11, and Table 1.8-2 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 Environment Report.

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Table 1.8-2 (17 of 29)

Item No.	Description
COL 10.4(1)	The COL applicant is to establish operational procedures and maintenance programs for leak detection and contamination control
COL 10.4(2)	The COL applicant is to maintain the complete documentation of system design, construction, design modifications, field changes, and operations
COL 10.4(3)	The COL applicant is to provide the location and design of the cooling tower, basin, and CW pump house
COL 10.4(4)	The COL applicant is to provide elevation drawings
COL 10.4(5)	The COL applicant is to address the design features for the prevention of contamination
COL 10.4(6)	The COL applicant is to provide operating and maintenance procedures for the following items in accordance with NUREG-0927 and a milestone schedule for implementation of the procedures.
COL 10.4(7)	The COL applicant is to describe the nitrogen or equivalent system design for SG drain
COL 10.4(8)	The COL applicant is to prepare the Site Radiological Environmental Monitoring Program
COL 10.4(9)	The COL applicant is to determine the wet bulb temperature correction factor to account for potential interference and recirculation effects
COL 11.2(1)	The COL applicant is to prepare the site-specific ODCM in accordance with NEI 07-09A.
COL 11.2(2)	The COL applicant is to prepare operational procedures and programs related to operations, inspection, calibration, and maintenance of the contamination control program.
COL 11.2(3)	The COL applicant is to determine whether contaminated laundry is sent to an offsite facility for cleaning or for disposal.
COL 11.2(4)	The COL applicant is to prepare and provide the P&IDs.
COL 11.2(5)	The COL applicant is to perform a site-specific cost-benefit analysis following the guidance in the regulatory requirements of NRC RG 1.110.
COL 11.2(6)	The COL applicant is to provide reasonable assurance that the mobile or temporary equipment and interconnections to plant systems conform with the regulatory requirements and guidance of 10 CFR 50.34a, 10 CFR 20.1406, NRC RG 1.143, and ANSI/ANS 40.37.
COL 11.2(7)	The COL applicant is to develop the procedure for the collection and shipment of mixed wastes, if and when they are generated, for offsite treatment. The generation of mixed liquid wastes is minimized by process control and the controlled use of hazardous chemicals.
COL 11.2(8)	The COL applicant is to develop the interface design and provide the site-specific information for the LWMS effluent discharge, including radioactive release points, effluent temperature, the design (type, shape, and size) of flow orifices, and the sampling requirements following the guidance of NRC RG 1.21 and RG 4.15 and the standards incorporated therein by reference.

responsible for providing the nitrogen gas, or equivalent, for the protection of the SG.

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The APR1400 SGs use a “central” blowdown system arrangement. In this arrangement, blowdown holes are drilled from the lower part of blowdown pipe where it is installed at the top of tube sheet. This arrangement is shown as Figure 10.4.8-3 and facilitates effective sludge removal from the tube sheet. The blowdown from each SG is depressurized by the pressure control valves located in the vent line of the blowdown flash tank where water and flashing vapor are separated. The vented steam is discharged to the high-pressure feedwater heater. When the high-pressure feedwater heater is unavailable, the vent pass is diverted to condenser.

10.4.8.2.3.3 Plant Shutdown

During long-term shutdown periods, the WLS is used to control the water chemistry in the SG. Following draining or dry lay-up, the WLS refills the SGs.

10.4.8.2.3.4 Steam Generator Drain

The SGBS is used to drain the SGs for maintenance or for a refueling shutdown. In this mode, the blowdown drain water is directed to the liquid radwaste system only when radioactivity is detected, otherwise drained to [[the wastewater treatment system (WWTS)]]. The COL applicant is ~~to describe the nitrogen or equivalent system design for the SG drain (COL 10.4(7)).~~

responsible for providing the nitrogen gas, or equivalent, for the protection of the SG

10.4.8.2.3.5 Abnormal Operation

a. Condenser tube leakage

In the event of a main condenser tube leakage and concurrent high sodium concentration downstream of the demineralizers and filters treating impurities, the blowdown water is discharged to [[the WWTS]].

b. Containment isolation signals

The containment isolation valves are automatically isolated at the following signals:

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level alarms are provided at the local panel. The auxiliary boiler package is provided with the necessary controls and indications for local or remote monitoring of system operation.

The radiation monitor is provided to monitor leaked radioactive materials in the condensed water from the boric acid concentrator package, gas stripper package, or solid waste treatment system. If the condensate is contaminated, the radiation monitor actuates an alarm in the MCR and automatically redirects the condensate to the liquid waste management system for treatment.

10.4.11 Combined License Information

COL 10.4(1) The COL applicant is to establish operational procedures and maintenance programs for leak detection and contamination control.

COL 10.4(2) The COL applicant is to maintain the complete documentation of system design, construction, design modifications, field changes, and operations.

COL 10.4(3) The COL applicant is to provide the location and design of the cooling tower, basin, and CW pump house.

COL 10.4(4) The COL applicant is to provide elevation drawings.

COL 10.4(5) The COL applicant is to address the design features for the prevention of contamination.

COL 10.4(6) The COL applicant is to provide operating and maintenance procedures for the following items in accordance with NUREG-0927 and a milestone schedule for implementation of the procedures.

COL 10.4(7) The COL applicant is to ~~describe the nitrogen or equivalent system design for SG drain.~~

COL 10.4(8) The COL applicant is to prepare the Site Radiological Environmental Monitoring Program.

responsible for providing the nitrogen gas, or equivalent, for the protection of the SG.