

KHNPDCDRAIsPEm Resource

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Sent: Monday, July 27, 2015 10:46 AM
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Cc: Reddy, Devender; Dias, Antonio; Betancourt, Luis; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 122-8053 (10.03 - Main Steam Supply System)
Attachments: APR1400 DC RAI 122 SPSB 8053.pdf; image001.jpg

KHNP

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs. However, KHNP requests, and we grant, 60 days to respond to this RAI. We may adjust the schedule accordingly.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 122-8053

Issue Date: 07/27/2015

Application Title: APR1400 Design Certification Review – 52-046

Operating Company: Korea Hydro & Nuclear Power Co. Ltd.

Docket No. 52-046

Review Section: 10.03 - Main Steam Supply System

Application Section:

QUESTIONS

10.03-1

Conformance to GDC 4, as related to environmental and dynamic effects, requires that the safety-related portions of the main steam supply system (MSSS) design should adequately consider water (steam) hammer and relief valve discharge loads to assure that system safety functions can be performed and should assure that operating and maintenance procedures include adequate precautions to prevent water (steam) hammer and relief valve discharge loads.

DCD Tier 2, Section 10.3.2.4.5 addresses the issue of water (steam) hammer, relief valve discharge loads, and water entrainment effects as described in GDC 4 ("SRP Acceptance Criteria," Item II of SRP Section 10.3). The applicant also included a COL Item 10.3(1) for the COL applicant(s) to provide operating and maintenance procedures including adequate precautions to prevent water (steam) hammer and relief valve discharge loads and water entrainment effects in accordance with NUREG-0927 and a milestone schedule for implementation of the procedure.

The staff finds the information provided in COL Item 10.3(1) is not clarifying enough to support a COL application and, for this reason, the applicant is requested to revise the COL item to include the following information:

- a. Prevention of rapid valve motion
- b. Introduction of voids into water-filled lines and components
- c. Proper filling and venting of water-filled lines and components
- d. Introduction of steam or heated water that can flash into water-filled lines and components
- e. Introduction of water into steam-filled lines or components
- f. Proper warmup of steam-filled lines
- g. Proper drainage of steam-filled lines
- h. Effects of valve alignments on line conditions

The applicant is to provide a DCD markup of its response.

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10.03-2

Conformance to GDC 4, as it relates to residual heat removal (RHR), requires that the safety-related portion of the main steam supply system (MSSS) is to remove residual and sensible heat from the reactor coolant system (RCS) in pressurized water reactor (PWR) plants (Item 3, Section IV, Evaluation Findings,” of SRP Section 10.3).

In DCD Tier 2, Section 10.3.1, “Design Bases,” the applicant states that the MSSS meets the requirements of GDC 34 to provide sufficient cooldown capacity and suitable power supply and redundancy to provide reasonable assurance of functionality during a loss of offsite power (LOOP). Also, DCD Tier 2, Section 10.3.2.2.4 states that a main steam atmospheric dump valve (MSADV) is provided on each main steam line upstream of the main steam safety valves (MSSVs) to allow cooldown of the steam generators (SGs) when the main steam isolation valves (MSIVs) are closed or when the main condenser is not available as a heat sink. Further, the DCD describes that these MSADVs are connected to the main steam piping, and isolation valves are provided in the steam line upstream of each MSADV.

However, the staff finds that, according to DCD Tier 2, Section 10.3.2.3, “System Arrangement,” there are no isolation valves in the main steam lines between the SGs and the MSSVs.

The applicant is requested to clarify whether these isolation valves exists and, if so, where/what they are. The applicant is also requested to clarify whether MSADVs can be operated by a local manual control in the event of total loss of power, including information regarding the local manual control station and its location.

10.03-3

10 CFR 50.63 indicates that “... a standard design certification ... under Part 52 of this chapter must be able to withstand for a specified duration and recover from a station blackout as defined in § 50.2.”

DCD Tier 2, Section 10.3.1 describes the safety-related portions of the MSSS designed to provide decay heat removal capability necessary for core cooling and safe shutdown during a station blackout (SBO) event. Also stated is a discussion of the SBO event and conformance with the guidance in Reg Guide 1.155 is provided in Section 8.4.

The staff finds there is a lack of details in the description on how the APR1400 copes with an SBO event.

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The applicant is requested to provide design and operating details for the MSSS and its components, as related to the SBO event.

