

KHNPDCDRAIsPEm Resource

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Sent: Friday, February 03, 2017 1:26 PM
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Cc: McCoppin, Michael; Ciocco, Jeff; Wunder, George; Dias, Antonio; Stubbs, Angelo
Subject: APR1400 Design Certification Application RAI 537-8664 [10.4.9 - Auxiliary Feedwater System (PWR)]
Attachments: APR1400 DC RAI 537 SPSB 8664.pdf

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, 120 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 537-8664

Issue Date: 02/03/2017
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 10.04.09 - Auxiliary Feedwater System (PWR)
Application Section: 10.04.09

QUESTIONS

10.04.09-8

Follow-up to RAI-86-8003, Question 10.04.09-6.

NUREG-0800, SRP 10.4.9, Section II, SRP Acceptance Criteria Item 5 states that, in regards to GDC 34, and 44, the recommendations of NUREG-0611 and NUREG-0635 shall also be met.

TMI Action Plan item II.E.1.1 of NUREG-0737 and 10 CFR 50.34(f)(1)(ii) for applicants subject to 10 CFR 50.34(f) require an AFWS reliability analysis. An acceptable AFWS should have unreliability in the range of 10⁻⁴ to 10⁻⁵ per demand, exclusive of station blackout scenarios. Compensating factors (e.g., other methods of accomplishing AFWS safety functions or other reliable methods for cooling the reactor core during abnormal conditions) may be considered to justify a larger AFWS unavailability.

DCD Tier 2, Section 10.4.9.1.2 (Item O) indicates that an auxiliary feedwater system (AFWS) reliability analysis was performed in accordance with Three Mile Island (TMI) Action Item II.E.1.1 of NUREG-0737, and that the AFWS is designed to have unavailability from 10⁻⁵ to 10⁻⁴ per demand as described in DCD Tier 2, Chapter 19. The staff was unable to locate the referenced information in Chapter 19. In RAI-86-8003, Question 10.04.09-6, issued July 16, 2015 the applicant was requested to provide the staff with the description and results of the AFWS reliability analysis that reference was made to in DCD Tier 2, Section 10.4.9.1.2.

By letter dated June 1, 2016, the applicant provided a response to RAI-86-8003, Question 10.04.09-6. In its response the applicant states that “the AFWS reliability analysis was performed in accordance with TMI action item II.E.1.1 of NUREG-0737, and that the results of the reliability analysis will be added as Table 10.4.9-6 in the DCD.”

The staff found the applicant response unacceptable for the reasons indicated below.

1. The applicant fails to provide a description of the AFWS reliability analysis as requested. NUREG 0737, item II.E.1.1 specifies that the applicant is to “perform a simplified AFW system reliability analysis that uses event-tree and fault-tree logic techniques to determine the potential for AFW system failure under various loss-of-main-feedwater-transient conditions. Particular emphasis is given to determining potential failures that could result from human errors, common causes, single-point vulnerabilities, and test and maintenance outages.” In its response to RAI-86-8003, Question 10.04.09-6 the applicant only states that “an AFWS analysis was performed in accordance with TMI Action Item II.E.1.1 of NUREG -0737”. The description of the performed reliability analysis was not provided and there was no discussion as to why such analysis is in accordance with TMI Action Item II.E.1.1 of NUREG -0737.

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2. In response to RAI-86-8003, Question 10.04.09-6, the applicant proposes to eliminate the words “as described in Chapter 19” in item O of DCD Tier 2, Section 10.4.9.1.1 and replace them with the words “as shown in Table 10.4.9-6.” The propose change indicates that the reliability analysis for which results are being provided is not discussed in DCD Tier 2, Chapter 19, and yet no information on such reliability analysis is incorporated into Section 10.4.9 of the DCD. In other words, the application is void of any information on such reliability analysis. As originally indicated, it would be best for such information to be added to DCD Tier 2, Chapter 19 which contains all PRA details of the application.
3. In response to the RAI-86-8003, Question 10.04.09-6, the applicant proposed adding Table 10.4.9-6 entitled “AFWS Unreliability Results” to the DCD. The table contains two columns, one labeled “initiating events” and the other “probability.” The relationship between these two labels and an acceptable AFWS unavailability is not clear.

The staff requests that the applicant provide a description of the AFWS reliability analysis that was performed to support DCD Tier 2, Section 10.4.9.1.2 (Item O), and clarify how the information demonstrates compliance with the AFWS unavailability target. The DCD is also to be updated accordingly.