

KHNPDCDRAIsPEm Resource

From: Ward, William
Sent: Saturday, October 01, 2016 3:52 PM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; daegeun.ahn@gmail.com; Andy Jiyong Oh; Jungho Kim (jhokim082@gmail.com); Seokhwan Hur (shhur3658@gmail.com)
Cc: Ward, William; Ciocco, Jeff; Mitchell, Matthew; Reichelt, Eric; Vera, John
Subject: APR1400 Design Certification Application RAI 525-8685 [3.6.3 Leak-Before-Break Evaluation Procedures)
Attachments: APR1400 DC RAI 525 MCB 8685.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, the following RAI question response times. We may adjust the schedule accordingly.

03.06.03-8 : 45days

03.06.03-9 : 60days

03.06.03-10 : 45days

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

Thank you,

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Subject: APR1400 Design Certification Application RAI 525-8685 [3.6.3
Leak-Before-Break Evaluation Procedures)
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Options

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REQUEST FOR ADDITIONAL INFORMATION 525-8685

Issue Date: 10/01/2016
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 03.06.03 - Leak-Before-Break Evaluation Procedures
Application Section:

QUESTIONS

03.06.03-8

10 CFR Part 50, Appendix A, GDC 4, “Environmental and Dynamic Effects Design Bases,” requires structures, systems, and components to be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, it also allows the use of analyses reviewed and approved by the Commission to exclude from the design bases the dynamic effects of postulated pipe ruptures, when the analyses demonstrates that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

A staff-approved leak-before-break (LBB) analysis permits applicants to forego the need to install protective hardware, such as pipe whip restraints and jet impingement barriers, to mitigate the consequences of pipe breaks. The staff reviewed the applicant’s responses from RAI 237-8312 and has determined the information requested below is needed in order for the staff to complete its confirmatory analysis of the LBB Piping Evaluation Diagram (PED).

In the response to Question 03.06.03-4 (ADAMS Accession No. ML15335A584), KHNP provided a proprietary table of normal operating (NO) loads that were used to construct the LBB PED. The tabulated value for the direct vessel injection (DVI) Group 2 NO load does not agree with the values in Figure 3.6-35 of the APR1400 DCD. Please identify the correct value and provide the correct information in DCD markups, as appropriate.

03.06.03-9

10 CFR Part 50, Appendix A, GDC 4, “Environmental and Dynamic Effects Design Bases,” requires structures, systems, and components to be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, it also allows the use of analyses reviewed and approved by the Commission to exclude from the design bases the dynamic effects of postulated pipe ruptures, when the analyses demonstrates that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

The staff reviewed the applicant’s responses from RAI 237-8312 and has determined the information requested below is needed in order for the staff to complete its confirmatory analysis of the LBB Piping Evaluation Diagram (PED). The staff reviewed the applicant’s responses from RAI 237-8312 and has determined the information requested below is needed in order for the staff to complete its confirmatory analysis of the LBB PED.

REQUEST FOR ADDITIONAL INFORMATION 525-8685

While performing the confirmatory analysis, the NRC staff has not been able to confirm the Surge Line calculations. Examination of the PICEP input file for the surge line, "PICEP_SL.IN", provided in response to RAI Question 03.06.03-6 (ADAMS Accession No. ML16096A156), shows that the input for a fluid temperature did not agree with the values stated in the APR1400 DCD for either the hot leg end or for the pressurizer end, and Card 7 provides values for 45 degree turns/inch and entry loss coefficient that do not agree with the values in DCD Table 3.6-7. In addition, the leakage crack length that gives a 5 gpm flow for the high temperature pressurizer end is shorter than that for the lower temperature hot leg end (DCD Figs, 3.6-15 (HL) and 3.6-17 (PZR)) even though they are the same pipe sizes and have the same NO1 loads (used in process outlined in DCD page 3.6-46) for determining the leakage crack length. Please confirm the input values and calculations in the DCD are correct and provide copies of the PICEP.IN files for the surge line (intermediate pipe) and surge line / nozzle interface calculations.

03.06.03-10

10 CFR Part 50, Appendix A, GDC 4, "Environmental and Dynamic Effects Design Bases," requires structures, systems, and components to be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping, and discharging fluids, that may result from equipment failures and from events and conditions outside the nuclear power unit. However, it also allows the use of analyses reviewed and approved by the Commission to exclude from the design bases the dynamic effects of postulated pipe ruptures, when the analyses demonstrates that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping.

The staff reviewed the applicant's responses from RAI 237-8312 and has determined the information requested below is needed in order for the staff to complete its confirmatory analysis of the LBB Piping Evaluation Diagram (PED).

In performing the confirmatory analysis of the shutdown cooling (SC) Group 3 segment, the NRC staff has not been able to confirm DCD PED calculation. Please confirm the materials, input values and PED calculations are correct, and provide a copy of the PICEP.IN file.