

KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Thursday, August 20, 2015 10:31 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Harry (Hyun Seung) Chang; Andy Jiyong Oh; Steven Mannon
Cc: Betancourt, Luis; Lee, Samuel; Li, Yueh-Li; Clark, Theresa
Subject: APR1400 Design Certification Application RAI 166-8198 (03.06.02 - Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping)
Attachments: APR1400 DC RAI 166 MEB 8198.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, 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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Subject: APR1400 Design Certification Application RAI 166-8198 (03.06.02 - Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping)

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REQUEST FOR ADDITIONAL INFORMATION 166-8198

Issue Date: 08/20/2015

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 03.06.02 - Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping

Application Section:

QUESTIONS

03.06.02-3

In a public meeting on June 30, 2015, the NRC staff requested (MEB Section 3.6.2 Issue #1) the applicant to clarify the design requirements for the high-energy piping in the break exclusion area defined in DCD Tier 2, Subsection 3.6.2.1.4.3.1. The applicant was also requested to justify the departure, if any, from the staff's guideline as described in Branch Technical Position (BTP) 3-4, Part B, Subsection A(ii). In addition, the NRC staff requested (MEB Section 3.6.2 Issue #2) the applicant to clarify the inconsistencies in the criteria used for determining the break exclusion area (DCD Tier 2, Subsection 3.6.1.4.3.1) and crack exclusion area for high-energy and moderate-energy piping (DCD Tier 2, Subsection 3.6.1.4.3.2) and to justify the departure, if any, from the staff's guideline as described in BTP 3-4, Part B, Item A(ii). In a letter dated August 4, 2015 (ADAMS Accession No. ML15216A451), the applicant provided its responses to these two issues including a markup of DCD Subsection 3.6.2.1.4.1.3.1. The DCD markup includes a list of portions of system piping for which the break exclusion area expands to the auxiliary building anchor wall beyond the isolation valve.

Based on its review of the information provided by the applicant, the staff determined that the DCD Tier 2, Section 3.6.2.1.4.1.3.1, as revised in the markup, primarily addresses the applicant's design requirements for system piping within the break exclusion area. It should be noted that the staff's guideline as delineated in BTP 3-4 is intended to present a means of compliance with the requirements of 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 4 for the design of nuclear power plant structures, systems and components. This approach uses available piping design information to postulate pipe ruptures at locations having relatively higher potential for failure, such that an adequate level of protection may be achieved. Subject to certain design provisions as described in BTP 3-4, Part B, Item A (ii), the staff's guideline allows breaks and cracks associated with high-energy fluid systems piping in containment penetration areas to be excluded from the design basis because of the high consequence that breaks in this area could cause if they occurred. To support the staff's safety determination on the acceptability of expanding the break exclusion area to the auxiliary building anchor wall beyond the isolation valve, the applicant should provide additional information to justify the departure from the staff's guideline as described in BTP 3-4, Part B, Subsection A(ii). Specifically, the applicant should describe how the DCD break exclusion area design requirements are considered and applied to the results of the design of these listed portions of system piping. The information should include the following information related to the additional design provisions for the break exclusion area in BTP 3-4:

- a) A summary of pressure and temperature conditions during normal plant conditions (either in operation or maintained pressurized) including their respective operational period, supporting the applicant's categorization of these portions of system piping as high or moderate energy.
- b) A figure for the general geometric configuration including the approximate length and any bends in the piping for those portions of system piping in the break exclusion area. The figure should include the inboard isolation valve, outboard isolation valve, and Main Steam Valve House (MSVH) anchor wall and the respective system piping for which breaks are not to be postulated.
- c) Based on the figure presented in item (b) above, a discussion of how piping bends, circumferential and longitudinal welds, and overall length were minimized to reduce piping stress and the size of the break exclusion area.
- d) A description of access provisions made to permit inservice volumetric examination (as delineated in Item f of DCD Subsection 3.6.2.1.4.1.3.1) of welds described in item (c) above.
- e) A discussion on whether the break exclusion only applies to the pertinent main piping (i.e., breaks are postulated for its associated branch piping, if any). If branch piping is included in the break exclusion area, then items (a) through (d) above should be addressed for these piping segments as well.
- f) A description of essential systems within the break exclusion area. DCD Subsection 3.6.2.1.4.1.3.1 states that essential equipment is not "concentrated" in the break exclusion zone. This statement is not clear and should be clarified.



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