KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Tuesday, November 03, 2015 6:40 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Harry (Hyun Seung) Chang; Andy Jiyong Oh; Erin Wisler
Cc: Haider, Syed; Segala, John; Umana, Jessica; Ward, William; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 290-8336 (06.02.01.03 - Mass and Energy Release Analysis for Postulated Loss-of-Coolant Accidents (LOCAs))
Attachments: APR1400 DC RAI 290 SCVB 8336.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, 45 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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Hearing Identifier: KHNP_APR1400_DCD_RAI_Public
Email Number: 339

Mail Envelope Properties (d5f9bd8d7c8345278b9229dca4cc958e)

Subject: APR1400 Design Certification Application RAI 290-8336 (06.02.01.03 - Mass and Energy Release Analysis for Postulated Loss-of-Coolant Accidents (LOCAs))
Sent Date: 11/3/2015 6:39:55 AM
Received Date: 11/3/2015 6:39:58 AM
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Priority: Standard
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REQUEST FOR ADDITIONAL INFORMATION 290-8336

Issue Date: 11/03/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 06.02.01.03 - Mass and Energy Release Analysis for Postulated Loss-of-Coolant Accidents (LOCAs)
Application Section: 6.2.1.3

QUESTIONS

06.02.01.03-1

Break Spectrum Analysis for Hot Leg Break LOCA

General Design Criterion 50, “Containment design basis” and Appendix K to 10 CFR Part 50, “ECCS Evaluation Models” require that the selected combination of power distribution shape and peaking factor should be the one that results in the most severe calculated consequences for the spectrum of postulated breaks and single failures that are analyzed. NUREG-0800, SRP Section 6.2.1.3, “Mass and Energy Release Analysis for Postulated Loss-of-Coolant Accidents (LOCAs)” suggests that containment design basis calculations should be performed for a spectrum of possible pipe break sizes and locations to assure that the worst case has been identified. Table 3-1, “Containment P/T with 1 Percent Metal-Water Reaction”, in the Technical Report (TeR) APR1400-Z-A-NR-14007-P, Rev.0, identifies the double-ended discharge leg slot break (DEDLSB) with maximum safety injection (SI) flow to be the most severe LOCA. The staff is concerned that the APR1400 methodology does not satisfy the required break spectrum analysis (small, medium, and large breaks) to identify the most limiting LOCA. This requirement appears to have been interpreted only in terms of hot leg and cold leg breaks as opposed to the break flow areas ranging from small slot to double-ended (DE) guillotine break. In this regard, the applicant is requested to address the following two questions and update the APR1400 DCD and TeR accordingly.

(1) This analysis follows the traditional assumption of a hot leg piping slot break of the same flow area as that of a double-ended guillotine piping rupture. However, the TeR does not report any double-ended (DE) guillotine break analysis results. The applicant is requested to demonstrate that a limiting double-ended (DE) guillotine break would result in less severe thermal-hydraulic conditions in the containment than in the limiting DEDLSB with maximum SI flow, or justify why such an analysis is not warranted.

(2) Table 3-1 in the TeR shows that the double-ended hot leg slot break (DEHLSB) results in the lowest peak pressure compared to all four cold leg breaks. It is not documented in the DCD or the TeR whether the DEHLSB was assumed to be the limiting break size for a hot leg LOCA or it was obtained from a break spectrum analysis. The applicant is requested to demonstrate that the mass and energy release and subsequent containment thermal-hydraulic response analyses for DEHLSB are most conservative across the possible hot break spectrum, including smaller slot break sizes.


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