

KHNPDCRAIsPEm Resource

From: Ciocco, Jeff
Sent: Tuesday, February 23, 2016 9:24 AM
To: apr1400rai@khnp.co.kr; KHNPDCRAIsPEm Resource; Andy Jiyong Oh; Young H. In (yhin@enercon.com); James Ross
Cc: Ayegbusi, Odunayo; Mrowca, Lynn; Steckel, James; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 410-8357 (19 - Probabilistic Risk Assessment and Severe Accident Evaluation)
Attachments: APR1400 DC RAI 410 SPRA 8357.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.

30	19-29:	30 days
30	19-30:	30 days
180	19-31:	180 days
30	19-32:	30 days
180	19-33:	180 days
30	19-34:	30 days

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

Thank you,

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Hearing Identifier: KHNP_APR1400_DCD_RAI_Public
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Subject: APR1400 Design Certification Application RAI 410-8357 (19 - Probabilistic Risk Assessment and Severe Accident Evaluation)
Sent Date: 2/23/2016 9:23:48 AM
Received Date: 2/23/2016 9:23:50 AM
From: Ciocco, Jeff

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MESSAGE	798	2/23/2016 9:23:50 AM
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Options

Priority: Standard
Return Notification: No
Reply Requested: No
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REQUEST FOR ADDITIONAL INFORMATION 410-8357

Issue Date: 02/22/2016

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation

Application Section:

QUESTIONS

19-29

Item 11 of Section II, “Acceptance Criteria,” of the (Draft) Revision 3 SRP, states, “The PRAs that meet the applicable supporting requirements for Capability Category I and meet the high-level requirements as defined in the ASME PRA Standard (ASME/ANS RA-S-2008 and addenda ASME/ANS RA-Sa-2009) should generally be acceptable for DC and COL applications. Alternatively, the applicant may identify, and justify the acceptability of, alternative measures for addressing PRA quality and technical adequacy. The staff should specifically review the acceptability of these alternative measures in the context of the specific uses and applications of the PRA.”

The staff reviewed the APR1400 design control document (DCD) Section 19.1.4.1.1, “Description of Level 1 Internal Events PRA for Operations at Power,” and found insufficient information describing the initiating event analysis performed. Specifically, the applicant did not identify and/or evaluate a very small loss of coolant accident (LOCA) initiating event for which generic data is available, common cause failure of 4.16kV AC buses and loss of direct current (LODC) power for the ‘C’ and ‘D’ trains. Therefore, in order for the staff to reach an assurance finding on the conformance to Standard Review Plan (SRP) Chapter 19.0 regarding PRA technical adequacy, please evaluate the very small LOCA initiating event or provide a justification for not evaluating it and revise the DCD accordingly.

19-30

Item 11 of Section II, “Acceptance Criteria,” of the (Draft) Revision 3 SRP, states, “The PRAs that meet the applicable supporting requirements for Capability Category I and meet the high-level requirements as defined in the ASME PRA Standard (ASME/ANS RA-S-2008 and addenda ASME/ANS RA-Sa-2009) should generally be acceptable for DC and COL applications. Alternatively, the applicant may identify, and justify the acceptability of, alternative measures for addressing PRA quality and technical adequacy. The staff should specifically review the acceptability of these alternative measures in the context of the specific uses and applications of the PRA.”

The staff reviewed the APR1400 design control document (DCD) Section 19.1.4.1.1, “Description of Level 1 Internal Events PRA for Operations at Power,” and found insufficient information describing the initiating event analysis performed. Specifically, the applicant did not describe the structured and systematic approach used to group initiating events (ASME/ANS PRA Standard supporting requirements – IE-B2). Therefore, in order for the staff to reach an assurance finding on the conformance to Standard Review Plan (SRP) Chapter 19.0 regarding

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PRA technical adequacy, please revise the DCD with a description of the approach used to group initiating events.

19-31

Item 11 of Section II, "Acceptance Criteria," of the (Draft) Revision 3 SRP, states, "The PRAs that meet the applicable supporting requirements for Capability Category I and meet the high-level requirements as defined in the ASME PRA Standard (ASME/ANS RA-S-2008 and addenda ASME/ANS RA-Sa-2009) should generally be acceptable for DC and COL applications. Alternatively, the applicant may identify, and justify the acceptability of, alternative measures for addressing PRA quality and technical adequacy. The staff should specifically review the acceptability of these alternative measures in the context of the specific uses and applications of the PRA."

The staff reviewed the APR1400 design control document (DCD) Section 19.1.4.1.1, "Description of Level 1 Internal Events PRA for Operations at Power," and found insufficient information describing the initiating event analysis performed. Specifically, the estimated frequency for the inadvertent opening of a safety relief valve (this was included into small loss of coolant accident (SLOCA), partial loss of component cooling water (PLOCCW), partial loss of essential service water (PLOESW) and loss of instrument air (LOIA) were taken from calculations in PRA supporting documents and not taken from generic data as discussed in the DCD. Therefore, in order for the staff to reach an assurance finding on the conformance to SRP Chapter 19.0 regarding PRA technical adequacy, please resolve the inconsistency and revise the DCD accordingly.

19-32

Item 11 of Section II, "Acceptance Criteria," of the (Draft) Revision 3 SRP, states, "The PRAs that meet the applicable supporting requirements for Capability Category I and meet the high-level requirements as defined in the ASME PRA Standard (ASME/ANS RA-S-2008 and addenda ASME/ANS RA-Sa-2009) should generally be acceptable for DC and COL applications. Alternatively, the applicant may identify, and justify the acceptability of, alternative measures for addressing PRA quality and technical adequacy. The staff should specifically review the acceptability of these alternative measures in the context of the specific uses and applications of the PRA."

The staff reviewed the APR1400 design control document (DCD) Section 19.1.4.1.1, "Description of Level 1 Internal Events PRA for Operations at Power," and found insufficient information describing the initiating event analysis performed. Specifically, the applicant did not describe its process for selecting industry initiating event frequencies instead of the frequencies estimated from calculation in PRA supporting documents and how the decision correlates with the statement in the DCD that all initiating event frequencies come from generic data. Therefore, in order for the staff to reach an assurance finding on the conformance to Standard Review Plan (SRP) Chapter 19.0 regarding PRA technical adequacy, please revise the DCD with a description of the process used to select initiating event frequencies.

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19-33

Item 11 of Section II, “Acceptance Criteria,” of the (Draft) Revision 3 SRP, states, “The PRAs that meet the applicable supporting requirements for Capability Category I and meet the high-level requirements as defined in the ASME PRA Standard (ASME/ANS RA-S-2008 and addenda ASME/ANS RA-Sa-2009) should generally be acceptable for DC and COL applications. Alternatively, the applicant may identify, and justify the acceptability of, alternative measures for addressing PRA quality and technical adequacy. The staff should specifically review the acceptability of these alternative measures in the context of the specific uses and applications of the PRA.”

The staff reviewed the APR1400 design control document (DCD) Section 19.1.4.1.1, “Description of Level 1 Internal Events PRA for Operations at Power,” and found insufficient information describing the initiating event analysis performed. Specifically, the applicant did not describe how it modeled the combination of individual component failures with the unavailability of other components during initiating event fault tree modeling (ASME/ANS PRA Standard supporting requirements – IE-C10). Therefore, in order for the staff to reach an assurance finding on the conformance to SRP Chapter 19.0 regarding PRA technical adequacy, please revise the DCD with a description of how the combination of component failures and unavailability were modeled.

19-34

Item 11 of Section II, “Acceptance Criteria,” of the (Draft) Revision 3 SRP, states, “The PRAs that meet the applicable supporting requirements for Capability Category I and meet the high-level requirements as defined in the ASME PRA Standard (ASME/ANS RA-S-2008 and addenda ASME/ANS RA-Sa-2009) should generally be acceptable for DC and COL applications. Alternatively, the applicant may identify, and justify the acceptability of, alternative measures for addressing PRA quality and technical adequacy. The staff should specifically review the acceptability of these alternative measures in the context of the specific uses and applications of the PRA.”

The staff reviewed the APR1400 design control document (DCD) Section 19.1.4.1.1, “Description of Level 1 Internal Events PRA for Operations at Power,” and found insufficient information describing the initiating event analysis performed. Specifically, the applicant stated in the DCD that the PRA meets the PRA standard, however the applicant did not compare the initiating event analysis results to available generic data and explain the differences to provide a reasonable check of the results as prescribed by PRA standard supporting requirement IE-C12. Therefore, in order for the staff to reach an assurance finding on the conformance to SRP Chapter 19.0 regarding PRA technical adequacy, please describe a comparison between the data sources and explain any differences in the DCD.



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