KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Tuesday, June 23, 2015 9:36 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Harry (Hyun Seung) Chang; Yunho Kim; Seung Choi
Cc: Travis, Boyce; Segala, John; Umana, Jessica; Betancourt, Luis; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 49-7825 (06.02.01.05 - Minimum Containment Pressure Analysis for Emergency Core Cooling System Performance Capability Studies)
Attachments: APR1400 DC RAI 49 SRSB 7825.pdf; image001.jpg

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 days to respond to the RAI's questions. We may adjust the schedule accordingly.

06.02.01.05-1: 30 days
06.02.01.05-2: 45 days
06.02.01.05-3: 30 days
06.02.01.05-4: 30 days

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

Thank you,

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United States Nuclear Regulatory Commission
Protecting People and the Environment

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Options
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REQUEST FOR ADDITIONAL INFORMATION 49-7825

Issue Date: 06/23/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 06.02.01.05 - Minimum Containment Pressure Analysis for Emergency Core Cooling System Performance Capability Studies
Application Section: 6.2.1.5

QUESTIONS

06.02.01.05-1

Section I.D.2 of Appendix K to 10 CFR Part 50 requires, in part, that the applicant calculate a containment pressure used for emergency core cooling system (ECCS) reflood conditions that shall not exceed a pressure conservatively calculated for that purpose. As specified in Standard Review Plan (SRP) Section 6.2.1.5, the conservatively calculated minimum pressure relies on a number of assumptions, including maximizing containment volume and heat transfer to heat sinks.

In Design Control Document (DCD) Tier 2, Section 6.2.1.5.4, the containment free volume used for the minimum pressure calculation is specified, and includes a "consideration of uncertainty." In a response to the RAI, provide additional detail on the value of this uncertainty, including the magnitude and reasoning used to determine the value, and provide what degree of margin there is from the calculated value versus the expected as-built free volume. Update DCD Tier 2, Section 6.2.1.5.4 with the margin used in the minimum pressure calculation. The staff needs this information to assess the degree of conservatism in the analysis.

06.02.01.05-2

Section I.D.2 of Appendix K to 10 CFR Part 50 requires, in part, that the applicant calculate a containment pressure used for ECCS reflood conditions that shall not exceed a pressure conservatively calculated for that purpose. As specified in SRP Section 6.2.1.5, the conservatively calculated minimum pressure relies on a number of assumptions, including maximizing containment volume and heat transfer to heat sinks.

Passive heat sinks are discussed in DCD Tier 2, Section 6.2.1.5.7 and listed in DCD Tier 2, Table 6.2.1-23. What, if any, margin to the expected as-built values is included in the table? Additionally, thermophysical properties for some materials used are slightly less conservative than those suggested by Branch Technical Position (BTP) 6-2. Are these properties representative of values of materials to be procured? The staff needs this information to assess the degree of conservatism in the analysis.

REQUEST FOR ADDITIONAL INFORMATION 49-7825

06.02.01.05-3

Section I.D.2 of Appendix K to 10 CFR Part 50 requires, in part, that the applicant calculate a containment pressure used for ECCS reflood conditions that shall not exceed a pressure conservatively calculated for that purpose. As specified in SRP Section 6.2.1.5, the conservatively calculated minimum pressure relies on a number of assumptions, including maximizing containment volume and heat transfer to heat sinks.

DCD Tier 2, Section 6.2.1.5.2 provides a reference to Table 6.2.1-40, while no such table exists. Potentially, the reference should be to Table 6.2.1-39, although the data for the integral releases in Table 6.2.1-39 does not appear to be correct. Provide correct references to figures and tables in the DCD in future revisions and update Table 6.2.1-39 with correct values.

06.02.01.05-4

Section I.D.2 of Appendix K to 10 CFR Part 50 requires, in part, that the applicant calculate a containment pressure used for ECCS reflood conditions that shall not exceed a pressure conservatively calculated for that purpose. As specified in SRP Section 6.2.1.5, the conservatively calculated minimum pressure relies on a number of assumptions.

In DCD Tier 2, Section 6.2.1.5, no information is provided with respect to the temperatures external to the containment, including the outside ambient air design temperature, used in the analysis. Do the external temperatures have any impact on the analysis (i.e., any effect on the initial temperature profile for concrete or containment wall heat sinks)? If so, update the DCD with the temperatures used in the analysis and provide why the temperatures chosen were conservative (technical specification minimum/maximum, as appropriate) in Sections 6.2.1.5 and 6.2.1. The staff needs this information to reach a safety finding that the minimum pressure calculated in Section 6.2.1.5 is a conservative value.


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