

KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Monday, November 16, 2015 7:07 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Harry (Hyun Seung) Chang; Andy Jiyong Oh; Erin Wisler
Cc: Goel, Raj; Segala, John; Umana, Jessica; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 306-8240 (06.02.06 - Containment Leakage Testing)
Attachments: APR1400 DC RAI 306 SCVB 8240.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,

Jeff Ciocco
New Nuclear Reactor Licensing
301.415.6391
jeff.ciocco@nrc.gov



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From: Ciocco, Jeff

Created By: Jeff.Ciocco@nrc.gov

Recipients:

"Goel, Raj" <Raj.Goel@nrc.gov>
Tracking Status: None
"Segala, John" <John.Segala@nrc.gov>
Tracking Status: None
"Umana, Jessica" <Jessica.Umana@nrc.gov>
Tracking Status: None
"Lee, Samuel" <Samuel.Lee@nrc.gov>
Tracking Status: None
"apr1400rai@khnp.co.kr" <apr1400rai@khnp.co.kr>
Tracking Status: None
"KHNPDCDRAIsPEM Resource" <KHNPDCDRAIsPEM.Resource@nrc.gov>
Tracking Status: None
"Harry (Hyun Seung) Chang" <hyunseung.chang@gmail.com>
Tracking Status: None
"Andy Jiyong Oh" <jiyong.oh5@gmail.com>
Tracking Status: None
"Erin Wisler " <erin.wisler@aecom.com>
Tracking Status: None

Post Office: HQPWMSMRS07.nrc.gov

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REQUEST FOR ADDITIONAL INFORMATION 306-8240

Issue Date: 11/16/2015

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 06.02.06 - Containment Leakage Testing

Application Section:

QUESTIONS

06.02.06-1

10 CFR Part 50, Appendix J, Option B, requires containment leakage rate testing be performed at the calculated peak containment internal pressure related to the design basis accident (DBA) and specified either in the technical specification or associated bases. DCD Tier 2, Section 6.2.6, specifies that the test pressure for the Type A, B, and C tests will be at the maximum calculated peak containment pressure under DBA. DCD Tier 2, Table 6.2.1-2, lists the maximum calculated peak containment pressure under DBA as 3.59 kg/cm² (51.09 psig). This pressure value of 51.09 psig is used in DCD Chapter 16, Technical Specifications (TS) Bases Section B.3.6.1 for containment leak rate test. But in TS Section 5.5.16 "Containment Leakage Rate Testing Program" under item b, the value of peak containment pressure for leak rate test is listed as 51.77 psig.

Please justify why a different value of peak containment pressure under DBA is used in TS Section 5.5.16.

06.02.06-2

10 CFR Part 50, Appendix J, requires preoperational and periodic containment leakage rate testing in accordance with the prescriptive requirements in Option A or the performance-based requirements in Option B. DCD Tier 2, Section 6.2.6, specifies the use of Option B for Type A, B, and C containment leakage rate testing. Regulatory guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," endorses NEI 94-01, Revision 0 for an acceptable method for complying with Option B. NEI 94-01 references ANSI/ANS 56.8-1994. DCD Tier 2, Section 6.2.4.2 and Section 14.2.1.120 reference that Type B and C leak rate testing is done in accordance with ANSI/ANS 56.8-1994. However, DCD Sections 6.2.4.4 and 6.2.6 reference that testing is done in accordance with ANSI/ANS 56.8 (Reference 31 which indicates 2002 version). The forward to ANSI/ANS 56.8-2002 states that it was issued as an update to the 1994 version of ANS standard and that its intended purpose is to consolidate the guidance from RG 1.163, NEI 94-01, and ANS 56.8-1994 into one document that could be referenced in the Technical Specifications. The NRC has not yet reviewed and accepted the 2002 version.

Submit ANSI/ANS 56.8-2002 for formal NRC review and approval and provide an explanation of how it comports with RG 1.163, NEI 94-01, and ANS 56.8-1994, or modify the DCD to reference ANSI/ANS 56.8-1994 throughout.

06.02.06-3

10 CFR Part 50, Appendix J, requires preoperational and periodic containment leakage rate testing in accordance with the prescriptive requirements in Option A or the performance-based requirements in Option B. DCD Tier 2, Section 6.2.6, specifies the use of Option B for Type A, B

REQUEST FOR ADDITIONAL INFORMATION 306-8240

, and C containment leakage rate testing. Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," endorses NEI 94-01, Revision 0 for an acceptable method for complying with Option B. DCD Tier 2, Section 6.2.8 "Combined License Information", COL 6.2(1) states that the COL applicant is to identify the implementation milestone for the containment integrated leakage rate test (CILRT) program. Also, in DCD Tier 2, Chapter 1, Table 1.9-7, item II.H "Containment Leak Rate Testing", it states that the maximum interval between Type C leakage rate tests, which is stated in the policy, is not addressed in the APR1400 DCD Tier 2. This policy is closely related to plant operation, so the maximum Type C test interval will be considered in the course of developing operator's containment leak rate testing program.

Please clarify what aspects of the containment leak rate testing program are to be certified as part of the design certification of the APR1400 and what are to be left for the COL Applicant (COLA). Proposed COL item 6.2(1) states that essentially the entire program is the responsibility of the COLA. However, DCD Tier 2, Table 1.9-1 states that the APR1400 conforms with RG 1.163 (thus, by reference, to NEI 94-01 and ANSI/ANS 56.8) and DCD Tier 2, Chapter 16 Technical Specifications (TS) Sections 3.6.1 and 5.5.16 describe a CILRT program. Further, there seem to be implied exceptions to RG 1.163 (e.g. not Type C testing all containment isolation valves (CIVs); insufficient test, vent and drain valves to properly test the CIVs; and not committing to the version of ANS referenced in RG 1.163). If there are exceptions to the standards and regulatory guidance, please specifically identify them in the DCD.

06.02.06-4

10 CFR Part 50, Appendix J, Option B, Section V.B.3 requires justification; including supporting analyses if a licensee (applicant) chooses to deviate from methods endorsed in the regulatory guide. As noted in the above RAI questions, there appear to be implied exceptions. Further, DCD Tier 2, Chapter 16 Technical Specifications (TS) Bases Section B 3.6.1 states "...comply with 10 CFR 50, Appendix J, Option B..., as modified by approved exemptions." DCD Tier 2, Chapter 16 TS Section 5.5.16 has similar words related to RG 1.163.

Please provide a list of any requested deviations or exemptions from Appendix J or RG 1.163 along with justification and supporting analyses in the DCD.

06.02.06-5

10 CFR Part 50, Appendix J, requires preoperational and periodical containment leakage testing in accordance with the prescriptive requirements in Option A or the performance-based requirements in Option B. DCD Tier 2, Section 6.2.6, specifies the use of Option B for Type A, B, and C containment leakage rate testing. Regulatory Guide (RG) 1.163, "Performance-Based Containment Leak-Test Program," endorses NEI-01, Revision 0 for an acceptable method for complying with Option B. NEI 94-01 references ANSI/ANS 56.8-1994.

ANSI/ANS 56.8 Section 6.3 discusses draining water from containment isolation valves (CIVs) for Type C testing and Section 3.2.5 discusses venting the downstream side of the valve for testing. These vent and drain connections are important to ensure accurate test results, but are not shown on DCD Tier 2, Figure

REQUEST FOR ADDITIONAL INFORMATION 306-8240

6.2.4-1. Please provide Figures showing the appropriate vent and drain connections for all CIVs that must be Type C tested in the DCD.

06.02.06-6

10 CFR Part 50, Appendix J, requires preoperational and periodical containment leakage testing in accordance with the prescriptive requirements in Option A or the performance-based requirements in Option B. DCD Tier 2, Section 6.2.6, specifies the use of Option B for Type A, B, and C containment leakage rate testing. Standard Review Plan (SRP) Section 6.2.6, Regulatory Guide (RG) 1.163 and Section 3.3.1 of ANSI/ANS 58.6 provide 3 cases where Type C tests are not required.

DCD Tier 2, Section 6.2.6.3 states that Appendix J, Option B, Type C leakage tests are conducted for all containment isolation valves (CIVs) as specified in DCD Tier 2, Table 6.2.4-1. Section 6.2.6.3 also provides 3 criteria which are used by the applicant to determine which CIV will be Type C tested. However, these 3 criteria are different than the 3 cases specified in the NRC staff's guidance. In addition, DCD Tier 2, Table 6.2.4-1 lists all of the CIVs along with a column indicating whether or not Type C leakage testing will be performed and a separate column listing the justification for not testing. Many of the CIVs listed in the table will not have Type C tests performed and many of those do not provide a justification.

Either revise the 3 criteria in the DCD to be consistent with the 3 cases in the NRC staff's guidance, or provide justification for using different criteria. Also, revise DCD Tier 2, Table 6.2.4-1 to apply the new correct criteria and to include a justification for each valve that is proposed to be excluded from the Type C leak rate test program.

06.02.06-7

DCD Tier 2, Section 6.2.6 specifies the use of Appendix J, Option B, for Type A, B, and C containment leakage rate testing. Regulatory Guide (RG) 1.163 endorses NEI-01, Revision 0 for an acceptable method for complying with Option B. NEI references ANS/ANS 56.8-1994. Standard Review Plan (SRP) Section 6.2.6 and ANS-56.8 (Section 6.2) specify that all containment isolation valves (CIVs) are to be tested so that the test pressure is applied in the same direction that would occur in a design basis accident (DBA), unless such testing would give equivalent or more conservative results.

In order to ensure compliance with this guidance, please provide (or indicate where in the DCD application it is provided):

- 1) A list of those CIVs that will be locally (Type C) leakage rate tested with test pressure applied in a direction opposite to that which would occur in a DBA.
- 2) For each CIV identified in 1), above, please justify that any Type C containment leakage test results conducted in such manner will result in equivalent or more conservative test results.
- 3) Also, provide DCD figures that are complete and meet the Type C test requirements and guidance related to test direction or provide the required exemption requests and justification.

06.02.06-8

DCD Tier 2, Section 6.2.6.2 briefly discusses the Appendix J, Option B, Type B, leakage rate testing of containment penetrations and mentions Type B tests of personnel airlocks, the equipment hatch, fuel transfer tube flange and electrical penetrations. DCD Tier 2, Figure 6.2.4-1 Sheets 11 and 12 show the airlock and equipment hatch. However, they do not show any leak test connections or the seal arrangements. Please provide this information in the DCD.

REQUEST FOR ADDITIONAL INFORMATION 306-8240

In addition, DCD Tier 2, Figure 6.2.4-1 Sheet 13 provides a drawing of a typical electrical penetration assembly, but does not show any test connections. If some of the electrical penetrations to be used are not fully sealed, they may require leak test provisions. Are the penetrations fully sealed or do they use flexible seals? Are there leak test provisions? Please clarify this situation in the DCD and supply the documentation as necessary. If they are not to be subject to leak rate testing, please explain and justify.

06.02.06-9

10 CFR Part 50, Appendix J, requires preoperational and periodic containment leakage rate testing in accordance with the prescriptive requirements in Option A or the performance-based requirements in Option B. DCD Tier 2, Section 6.2.6, specifies the use of Appendix J, Option B for Type A, B, and C containment leakage rate testing. SRP Section 6.2.6 states that all containment penetrations requiring Type B test and all containment isolation valves requiring a Type C test should be listed in the test program. The program should identify any penetration not requiring leakage rate testing and the reason for not requiring a test should be stated.

DCD Table 6.2.4-1 "List of Containment Penetration and System Isolation Positions", and Figure 6.2.4-1 "Containment Isolation Valve Arrangement" indicate item numbers and does not show any penetration numbers associated with containment isolation valves and electrical penetrations. Table 6.2.4-1 also does not list spare penetrations or penetrations that will be used in the CILRT to facilitate controlled pressurization and depressurization of the containment using temporary air compressors and dryers indicated in DCD Section 6.2.6.1.

Provide information where the item numbers in Table 6.2.4-1 are linked to all penetration numbers in the DCD. Justify if there are spare penetrations and not listed. Provide information indicating penetrations that will be used in the CILRT for temporary air compressors to facilitate controlled pressurization and depressurization.

06.02.06-10

Appendix J, Option A, Section III.A.1(a), requires that no repairs or adjustments be made to the containment prior to the performance of the containment integrated leakage rate test (CILRT) so that the containment can be tested in as close to the "as is" condition as practical. Under Option B, RG 1.163 endorses NEI 94-01, Revision 0 (with certain exceptions), which provides similar guidance in Section 8.0 and 9.0.

Provide information in the DCD that during the period between the initiation of the containment inspection and the performance of the Type A test, no repairs or adjustments shall be made so that the containment can be tested to the "as-is" condition as practical.



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