

KHNPDCRAIsPEm Resource

From: Ciocco, Jeff
Sent: Tuesday, August 25, 2015 10:18 AM
To: apr1400rai@khnp.co.kr; KHNPDCRAIsPEm Resource; Harry (Hyun Seung) Chang; Andy Jiyong Oh; James Ross
Cc: Downey, Steven; Mitchell, Matthew; Ward, William; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 168-8140 (05.02.04 - Reactor Coolant Pressure Boundary Inservice Inspection and Testing)
Attachments: APR1400 DC RAI 168 MCB 8140.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.

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

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 168-8140

Issue Date: 08/25/2015

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 05.02.04 - Reactor Coolant Pressure Boundary Inservice Inspection and Testing

Application Section: 05.02.04

QUESTIONS

05.02.04-1

Title 10 of the Code of Federal Regulations (CFR) section 50.55a(g), "Inservice Inspection Requirements," states, "Systems and components of boiling and pressurized water-cooled nuclear power reactors must meet the requirements of the ASME BPV [Boiler and Pressure Vessel] Code as specified in this paragraph." Sub-paragraph 50.55a(g)(3) gives the requirements for plants to be licensed under Part 52. In order to make a safety determination regarding these requirements, NRC staff is requesting additional information regarding the inservice inspection of bottom mounted instrumentation (BMI) nozzles.

Based on operating experience where cracking and leakage was identified in bottom mounted instrumentation (BMI) nozzles on PWR lower reactor pressure vessel (RPV) lower heads, the NRC issued Bulletin 2003-02, "Leakage from Reactor Pressure Vessel Lower Head Penetrations and Reactor Coolant Pressure Boundary Integrity (ML032320153)," to advise PWR licensees that current methods of inspecting the RPV lower heads may need to be supplemented with additional measures (e.g., bare metal visual inspections) to detect reactor coolant pressure boundary leakage. In APR1400 FSAR Sections 5.1 and 5.3.3, the applicant states that the lower head is welded to the RPV shell and contains 61 in-core instrumentation nozzle penetrations. In light of this fact, the staff determined that the issues identified in NRC Bulletin 2003-02 are applicable to the APR1400. However, the applicant has not provided any information in the DCD to address this issue. Therefore, the staff requests the following:

1. Revise FSAR Section 5.2.4 to describe how the ASME Code ISI program for the APR1400 will be augmented to ensure the structural and leakage integrity of the RPV lower head penetrations. The description should include the following:
 - a. The extent of inspections which will be conducted with respect to the areas and penetrations to be inspected,
 - b. The inspection methods to be used,
 - c. The qualifications standards for the inspection methods,
 - d. The process used to resolve the source of findings of boric acid deposits or corrosion,
 - e. The inspection documentation to be generated, and,
 - f. The basis for concluding that the plant will satisfy applicable regulatory requirements.
2. Operating PWRs have addressed this issue by performing bare metal visual inspections of the bottom head and nozzle penetrations. If this approach is taken for the APR1400, then the applicant needs to describe in the FSAR how any coatings applied to the RPV prior to shipping will be removed to ensure that the inspections can be performed properly. This issue may be most appropriately addressed in a revision of FSAR Section 5.3.3, but is being initially identified here as it directly related to effective visual examination of the RPV lower head penetrations.
3. 10 CFR 50.55a(g)(3) requires that all ASME Code Class 1 components be designed and provided with access to perform the required inspections. Therefore, in addition to describing the inspection methods used to address the issue, the applicant must also describe how the BMI nozzles are designed and provided with access to perform the required inspections.

05.02.04-2

In a letter dated July 17, 2015 (ML15198A549), the applicant provided responses to the issues associated with APR1400 FSAR Section 5.2.4 (ML15198A564) that were discussed at the June 30, 2015 public meeting. The staff has reviewed the applicant's responses and determined that they are acceptable provided that the statements are made in the FSAR. In most cases, the applicant had already provided draft revisions to the FSAR along with the issue response. However, the applicant did not provide any proposed revisions to the FSAR for Issue #6 or Issue #8. Therefore, the staff requests that APR1400 FSAR Section 5.2.4 be revised, as appropriate, to include the responses to Issue #6 (Action Item 5-5.6) and Issue #8 (Action Item 5.5-8).

