

KHNPDCDRAIsPEm Resource

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Sent: Thursday, October 22, 2015 8:33 AM
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Cc: Grady, Anne-Marie; Segala, John; Umana, Jessica; Lee, Samuel
Subject: APR1400 Design Certification Application RAI 264-8243 (06.02.05 - Combustible Gas Control in Containment)
Attachments: APR1400 DC RAI 264 SCVB 8243.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.

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

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 264-8243

Issue Date: 10/22/2015

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 06.02.05 - Combustible Gas Control in Containment

Application Section:

QUESTIONS

06.02.05-6

10 CFR Part 50 (c)(3) *Equipment Survivability*. Containments that do not rely upon an inerted atmosphere to control combustible gases must be able to establish and maintain safe shutdown and containment structural integrity with systems and components capable of performing their functions during and after exposure to the environmental conditions created by the burning of hydrogen. Environmental conditions caused by local detonations of hydrogen must also be included, unless such detonations can be shown unlikely to occur. The amount of hydrogen to be considered must be equivalent to that generated from a fuel clad-coolant reaction involving 100 percent of the fuel cladding surrounding the active fuel region.

Containment integrity depends on hydrogen control and mitigation because hydrogen burns can create short but extreme temperature conditions in containment. The systems and components required to establish and maintain safe shutdown and containment structural integrity following a severe accident are identified in DCD Tier 2, Table 19.2.3-4, "Systems and Equipment/Instrumentation Required for Equipment Survivability Assessments." This table currently includes the passive autocatalytic recombiners (PAR), and the hydrogen igniters (HI) from the hydrogen mitigation system. Maintaining the physical integrity of the piping penetration assemblies, including the penetration seals, is required to maintain containment integrity. The piping penetrations, including but not limited to the seals, should also be added to the list of containment penetrations in Table 19.2.3-4.

In the equipment survivability analysis described in DCD Tier 2, Section 19.2.3, credit is taken for maintaining the containment pressure below the factored load category of 123 psia, per DCD Tier 2, Section 19.2.4.2.3, by relying on the emergency containment spray backup system (ECSBS). See DCD Tier 2, Figure 19.1-3, Simplified Diagram – Containment Spray System. This is a single train system, with its own dedicated ECSBS spray ring header and an inside containment isolation check valve, V1014. This backup spray function is the basis provided for limiting the equipment survivability analysis to 24 hrs, as stated in DCD Tier 2, Section 19.2.3.3.7.2, "Determination of Severe Accident Environmental Conditions." This valve should be shown to meet the equipment survivability conditions, including surviving a hydrogen burn and remaining open. This valve should be added to DCD Tier 2, Table 19.2.3-4.

Please confirm that all of the check valves shown in DCD Figure 19.1-3, Simplified Diagram – Containment Spray System, are depicted correctly to indicate the direction of flow. Check valves V1014, V1008, and V1007 appear to be shown in an inconsistent direction as compared to V101 and V100. Adding flow direction arrows below the check valve symbol, as done in DCD Tier 2, Table 6.2.4-1, would provide clarification.

As part of your response, please revise all the affected DCD text, tables, and figures accordingly.



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