

KHNPDCDRAIsPEm Resource

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Sent: Tuesday, February 21, 2017 3:05 PM
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Cc: Umana, Jessica; Grady, Anne-Marie; O'Driscoll, James; McCoppin, Michael
Subject: APR1400 Design Certification Application RAI 541-8724 (06.02.05 - Combustible Gas Control in Containment)
Attachments: APR1400 DC RAI 541 SCVB 8724.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 541-8724

Issue Date: 02/21/2017
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: 6.2.5

QUESTIONS

06.02.05-12

This is a follow up question to KHNP's response to RAI 155-8167, Question 6.2.5-4, regarding passive autocatalytic recombiner (PAR) recombination rates.

10 CFR 52.44(c)(1) requires that a standard design certification applicant must ensure a mixed atmosphere in containment during design-basis and significant beyond design-basis accidents. A mixed atmosphere means that the concentration of combustible gases in any part of the containment is below a level that supports combustion or detonation that could cause loss of containment integrity.

APR1400 Design Control Document (DCD) Tier 2, Section 6.2.5 credits the passive autocatalytic recombiners (PAR) with meeting the above criteria.

However, in DCD Tier 1, Table 2.11.4-1, "Containment Hydrogen Control System ITAAC," there is insufficient information to determine that the containment hydrogen control system design meets the above criteria. In DCD Tier 2, Table 6.2.5-1, "Location of PARs and HIs," PAR and hydrogen igniters (HI) locations in containment are provided. This information should either be included in Tier 1, Table 2.11.4-1, or a link to Tier 2, Table 6.2.5-1 should be provided in Tier 1, Table 2.11.4-1.

Also, DCD Tier 2, Table 6.2.5-1 describes the PARs as "small, middle, large." The actual PAR recombination rates which form the basis of the hydrogen containment analysis should be provided in the DCD.

The response stated that the equation for the recombination rate for the large (FR1-1500) PARs has the two coefficients, A and B. The staff's review indicates that these coefficients, A and B, should be larger. These coefficients were deduced by comparing the recombination rate that is predicted by the formula to the performance specifications published for an AREVA PAR.

KHNP's response to RAI 472-8564, Question 6.2.5-11, confirmed the larger coefficients above were used by KHNP in their analyses. This is in agreement with the coefficients used in staff's MELCOR confirmatory calculation.

In the original RAI 155-8167, question 6.2.5-4, staff also requested the following:

REQUEST FOR ADDITIONAL INFORMATION 541-8724

DCD Tier 2, Table 6.2.5-1 describes the PARs as “small, middle, large.” The actual PAR recombination rates which form the basis of the hydrogen containment analysis should be provided in the DCD, either:

- Into both Tier 2, Table 6.2.5-1 and Tier 1, Table 2.11.4-1, or
- Into just Tier 2, Table 6.2.5-1, with a link to Tier 2, Table 6.2.5-1 being provided in Tier 1, Table 2.11.4-1.

Please provide the recombination rates of the three sizes of PARs which establish the capacity of the containment hydrogen control system.



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