

## KHNPDCDRAIsPEm Resource

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**Sent:** Friday, August 07, 2015 7:54 PM  
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**Cc:** Ciocco, Jeff; Lee, Samuel; Steckel, James; McKirgan, John; Haider, Syed  
**Subject:** APR1400 Design Certification Application RAI 143-8092 (15.6.5 - Loss-of-Coolant Accidents Resulting from the Spectrum of Postulated Piping Breaks within the RCPB)  
**Attachments:** image001.jpg; APR1400 DC RAI 143 SRSB 8092.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 143-8092

Issue Date: 08/07/2015

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 15.06.05 - Loss of Coolant Accidents Resulting From Spectrum of Postulated Piping Breaks Within the Reactor Coolant Pressure Boundary

Application Section: 15.6.5 "Loss-of-Coolant Accidents Resulting from the Spectrum of Postulated Piping Breaks within the Reactor Coolant Pressure Boundary"

### QUESTIONS

#### 15.06.05-1

##### Core Cooling during Small Break LOCA with Deep Loop Seal Design

General Design Criterion (GDC) 35, "Emergency Core Cooling," in 10 CFR Part 50, Appendix A, mandates the requirements for the emergency core cooling system (ECCS) that need to be satisfied by conforming to the ECCS acceptance criteria for light-water reactors given in 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-water Nuclear Power Reactors." 10CFR50.46(b)(1) identifies the peak cladding temperature (PCT) requirement; and 10CFR50.46(b)(5) requires that after any calculated successful initial operation of the ECCS, the calculated core temperature shall be maintained at an acceptably low value and decay heat shall be removed for the extended period of time to prevent the core from being uncovered. These requirements, along with 10CFR50.46(a)(1), specify the need to calculate the ECCS cooling performance using an acceptable evaluation model for a number of postulated loss-of-coolant accidents (LOCAs) of different sizes, locations, and other properties sufficient to provide assurance that the most severe LOCAs have been evaluated.

APR1400 DCD Section 15.6.5, "Loss-of-Coolant Accidents Resulting from the Spectrum of Postulated Piping Breaks within the Reactor Coolant Pressure Boundary," and the referenced Technical Report APR1400-F-A-NR-14001-P, "Small Break LOCA Evaluation Model," describe the analysis results of the small-break LOCA (SBLOCA) evaluation and core cooling with a deep loop seal, at a high level. The applicant needs to provide the technical basis to establish that the analysis methodology and applied computer codes conservatively characterize the safety-significant phenomena of loop seal formation and clearing, and peak cladding temperature during a limiting SBLOCA, for both **the initial phase of blowdown and reflood as well as the long term cooling with potential core reheat and secondary cladding temperature rise**. The information is needed to demonstrate that the APR1400 design with a deep loop seal geometry is capable of maintaining core cooling before and after the initial loop seal clearing, and the peak cladding temperature remains within acceptable limits for the most challenging SBLOCA sizes and locations, including cold leg slot breaks.

In addition to providing the technical basis requested above, the applicant is requested to make available to staff any analysis or calculation results that demonstrate meeting the acceptance criteria and update the DCD as appropriate to ensure the analysis method and results are documented.