

## **KHNPDCDRAIsPEm Resource**

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**Sent:** Friday, June 17, 2016 6:12 PM  
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**Subject:** APR1400 Design Certification Application RAI 496-8630 [6.3 - Emergency Core Cooling System]  
**Attachments:** APR1400 DC RAI 496 SRSB 8630.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 496-8630

Issue Date: 06/17/2016  
Application Title: APR1400 Design Certification Review – 52-046  
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.  
Docket No. 52-046  
Review Section: 06.03 - Emergency Core Cooling System  
Application Section: 6.3

### QUESTIONS

#### 06.03-10

As required by 10 CFR 50.36(c)(3), the design must have surveillance requirements to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

As mentioned in RAI 158-7997, Question 06.03-7, the applicant stated “boron recycling operations are not used for the APR1400.” However, the staff noted that in DCD Tier 2, Section 9.3.4, the CVCS provides for the capability of recycling boron. The staff determined that it is unclear whether the APR1400 uses boron recycling for water contained in the SIS (IRWST and SITs). As documented in RAI 158-7997, Question 06.03-7, the staff determined the need for a technical specification and associated surveillance requirement if boron recycling is to be used in the APR1400. If boron recycling is not to be used in the APR1400, the DCD should clearly reflect that since there is currently no technical specification and surveillance requirement that verifies the boron-10 atom percent of the SIS water when that water is recycled.

The staff needs the applicant to update DCD Tier 2, Section 6.3 and Section 9.3.4 to clearly specify whether or not boron recycling will be used for SIS water (IRWST and SITs) in the APR1400. If boron recycling is to be used, the applicant shall provide a discussion in the DCD about how the current proposed technical specifications and surveillance requirements ensure a minimum boron-10 atom percent when that water is recycled, or provide an additional technical specification and surveillance requirement as laid out in RAI 158-7997, Question 06.03-7. If boron recycling is not to be used, the applicant shall provide a clear discussion in the DCD detailing that boron-10 atom percent surveillance verification of the SIS water is not necessary since boron recycling will not be used for the APR1400. The staff must ensure that for a COL applicant incorporating the APR1400 by design, who wishes to utilize the APR1400's capability of boron recycling, a technical specification and surveillance requirement must be added to the applicant's technical specifications to ensure boron-10 atom percent is greater than some minimum limit after recycling.

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### 06.03-11

As required by 10 CFR 52.47(b)(1), the application must have the proposed inspections, tests, analyses, and acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the Act, and the Commission's rules and regulations.

In the applicant's proposed DCD markups in response to RAI 158-7997, Question 06.03-4, the applicant deleted "6.7 m (22 ft)" from the acceptance criteria of ITAAC item 9.c in Tier 1, Table 2.4.3-4. Based on this portion of the markup, the staff could not conclude that the applicant's ITAAC item was sufficient in meeting the requirements of 10 CFR 52.47(b)(1).

The staff requests the applicant to provide the value of NPSHa and NPSHr in the acceptance criteria of ITAAC item 9.c in Tier 1, Table 2.4.3-4. This value should be consistent with the values presented in DCD Tier 2, Section 6.3.

The staff notes it does not have any remaining questions on the other portion of the markups provided in response to RAI 158-7997, Question 06.03-4 regarding the added language on worst case conditions.

### 06.03-12

As required by GDC 2, the design must ensure that structures, systems, and components important to safety shall be designed to withstand the effects of natural phenomena such as earthquakes, tornadoes, hurricanes, floods, tsunamis, and seiches without loss of capability to perform their safety functions.

In the applicant's response to RAI 158-7997, Question 06.03-5, the applicant clarified that the SIFT is designed to NNS seismic category III standards. However, DCD Tier 2, Figure 6.3.2-1 shows the SIFTs as seismic category II.

The staff requests the applicant to correct the inconsistency between DCD Tier 2, Figure 6.3.2-1 and DCD Tier 2, Table 3.2-1, as discussed in RAI 158-7997, Question 06.03-5.

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### 06.03-13

As required by 10 CFR 52.47(b)(1), the application must have the proposed inspections, tests, analyses, and acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the Act, and the Commission's rules and regulations.

The staff noted that in DCD Tier 2, Section 6.3.1.5, the applicant claims adequate physical separation is provided between the redundant piping paths and containment penetrations of the SIS so that the SIS meets its functional requirements even with a single failure. The staff determined that the applicant's current proposed Tier 1 ITAAC are not sufficient to ensure that adequate physical separation, to the extent practical, is provided for each division of the SIS to preclude the loss of the safety-related function by common-cause failure from postulated dynamic effects (i.e. missile and pipe break hazards), internal flooding, and fire.

The staff requests the applicant to provide an ITAAC item for the SIS that ensures each division is physically separated from the other divisions to preclude the loss of safety-related function by common-cause failure from postulated dynamic effects (i.e. missile and pipe break hazards), internal flooding, and fire. The acceptance criteria of this ITAAC item should ensure that the components of each division located outside containment are in separate enclosed areas, and the components of each division located inside containment are physically separated to the practical extent to preclude the loss of the safety-related function by common-cause failure from postulated dynamic effects (i.e. missile and pipe break hazards), internal flooding, and fire.