

## **KHNPDCDRAIsPEm Resource**

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**Sent:** Tuesday, March 15, 2016 2:11 PM  
**To:** apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Junggho Kim (jhokim082@gmail.com); Andy Jiyong Oh; James Ross  
**Cc:** Le, Hien; Karas, Rebecca; Ward, William; Williams, Donna  
**Subject:** APR1400 Design Certification Application RAI 443-8555 (05.04 - Reactor Coolant System Component and Subsystem Design)  
**Attachments:** APR1400 DC RAI 443 SRSB 8555.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. However, KHNP requests, and we grant, 60 days to respond to this RAI. We may adjust the schedule accordingly.

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

Thank you,

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## REQUEST FOR ADDITIONAL INFORMATION 443-8555

Issue Date: 03/15/2016

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 05.04 - Reactor Coolant System Component and Subsystem Design

Application Section: DCD 5.4.1

### QUESTIONS

05.04-2

This is a follow-up to RAI 307-7835, Question 5.4-1 based on the response letter dated 1/7/2016.

The staff considered the responses to Items 5 and 7 incomplete for the following reasons:

1. In RAI 307-7835, the staff raised, in part, the following issue for Item 5:

DCD Subsection 5.4.1.2 states "If there is a simultaneous loss of CCW to all RCP and motor bearing assemblies but seal injection water is available to the seals, the RCP can operate for at least 30 minutes without bearing seizure, which could affect normal RCP coastdown."

DCD Subsection 9.2.2 identifies RCP pump/motor oil coolers and the charging pump mini-flow heat exchanger as nonessential components supported by the Division I CCW pump.

Based on the above descriptions, a failure of the Division I CCW pump will affect both the charging pump and the RCP pump/motor bearings. Therefore, the staff questions the availability of seal injection water during the stated 30-minute period. The applicant is requested to provide more detail on the following:

- a) Since the CCWS provides cooling water to both the CVCS (charging pump mini flow heat exchangers) and oil coolers for the RCP pump/motor bearings, explain what is meant by loss of CCW, and
- b) If "loss of CCW" includes cooling flow to CVCS, explain how seal injection flow to the RCPs will not be affected for "up to 30 minutes" to prevent seal damage.

In the response, the applicant stated "[T]he seal injection flow is provided by one of two charging pumps or an auxiliary charging pump of CVCS as described in DCD Subsections 5.4.1.2, 9.2.2.3, and 9.3.4.2. The auxiliary charging pump provides diverse means of seal injection when the normal means by the charging pump are unavailable. The operation of the auxiliary charging pump is not affected by loss of CCW whereas the charging pump is affected by improper function of the charging pump mini flow heat exchangers due to loss of CCW. If loss of CCW prevents the charging pump from proper operating, the seal injection flow to the RCP can be supplied by the auxiliary charging pump to prevent seal damage."

According to the CVCS description in DCD Subsection 9.3.4.2, the staff understands that the auxiliary charging pump can only be started manually by the plant operator, and therefore will not be able to provide the seal injection water to the RCPs within 30 minutes after a loss of CCW to all RCP coolers. The applicant is requested to provide further clarification regarding RCP seal injection during this 30-minute period, and revise the DCD accordingly.

2. In RAI 307-7835, the staff raised, in part, the following issue for Item 7:

## REQUEST FOR ADDITIONAL INFORMATION 443-8555

In DCD Subsection 5.4.1.2, the applicant states "As the seal is intended to withstand adverse SBO conditions, it is verified by a robust test program." The applicant is requested to provide a summary of the test results in DCD Section 5.4.1, and a reference to the document that describes this program.

In the response, the applicant stated "[T]he planning and execution of the seal tests is now in progress so that any documented information for the tests is currently not available. Test results are considered proprietary for the seal supplier and inappropriate to be included or referred in DCD. However, after the tests have been completed, available information will be uploaded to ERR for NRC review. Incorporating a general summary of tests into DCD will be considered in the future."

The applicant is requested to upload the above mentioned test results to ERR when they are available for the staff review and revise the DCD to incorporate a summary of these tests as stated in the response.



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