

## KHNPDCDRAIsPEm Resource

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**From:** Ciocco, Jeff  
**Sent:** Thursday, August 13, 2015 10:38 AM  
**To:** KHNPDCDRAIsPEm Resource  
**Subject:** FW: APR1400 Design Certification Application RAI 101-8007 (09.05.05 - Emergency Diesel Engine Cooling Water System)  
**Attachments:** APR1400 DC RAI 101 SPSB 8007.pdf

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**From:** Ciocco, Jeff  
**Sent:** Wednesday, July 22, 2015 2:24 PM  
**To:** apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource <KHNPDCDRAIsPEm.Resource@nrc.gov>; Harry (Hyun Seung) Chang <hyunseung.chang@gmail.com>; Yunho Kim <yshh8226@gmail.com>; Christopher Tyree <Christopher.tyree@aecom.com>  
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**Subject:** APR1400 Design Certification Application RAI 101-8007 (09.05.05 - Emergency Diesel Engine Cooling Water System)

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 the RAI question. We may adjust the schedule accordingly.

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

Thank you,

Jeff Ciocco  
New Nuclear Reactor Licensing  
301.415.6391  
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**Hearing Identifier:** KHNP\_APR1400\_DCD\_RAI\_Public  
**Email Number:** 165

**Mail Envelope Properties** (3a000ee6828e4292a5bb407c7fcc9b81)

**Subject:** FW: APR1400 Design Certification Application RAI 101-8007 (09.05.05 -  
Emergency Diesel Engine Cooling Water System)  
**Sent Date:** 8/13/2015 10:38:02 AM  
**Received Date:** 8/13/2015 10:38:03 AM  
**From:** Ciocco, Jeff

**Created By:** Jeff.Ciocco@nrc.gov

**Recipients:**  
"KHNPDCDRAIsPEm Resource" <KHNPDCDRAIsPEm.Resource@nrc.gov>  
Tracking Status: None

**Post Office:** HQPWMSMRS08.nrc.gov

<b>Files</b>	<b>Size</b>	<b>Date &amp; Time</b>
MESSAGE	1243	8/13/2015 10:38:03 AM
APR1400 DC RAI 101 SPSB 8007.pdf		90852
image001.jpg	5040	

**Options**  
**Priority:** Standard  
**Return Notification:** No  
**Reply Requested:** No  
**Sensitivity:** Normal  
**Expiration Date:**  
**Recipients Received:**

## REQUEST FOR ADDITIONAL INFORMATION 101-8007

Issue Date: 07/22/2015

Application Title: APR1400 Design Certification Review – 52-046

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

Docket No. 52-046

Review Section: 09.05.05 - Emergency Diesel Engine Cooling Water System

Application Section: 9.5.5

### QUESTIONS

09.05.05-1

Section 9.5.5 of NUREG-0800 states that the staff is to assure that essential emergency diesel engine cooling water system (EDECWS) portions, including the isolation valves separating essential and non-essential portions, are classified as quality Group C and Seismic Category I.

DCD Tier 2, Figure 9.5.5-1 contains the interface between the nonsafety-related pre-heat water system and the safety-related portions of the high temperature (HT) cooling water system. The figure shows an isolation valve classified as seismic category II and quality group D.

The applicant is requested to justify how this classification is sufficient to protect a safety-related, seismic category I system, in the event of failure of a nonsafety-related SSC

09.05.05-2

Section 9.5.5 of NUREG-0800 states that adequate volume should be available to maintain system water level and pump net positive suction head without refill, assuming expected water loss over a seven-day period of engine operation. SRP Section 9.5.5 also requests review of performance requirements to determine the time available to provide cooling water to the diesels and the other systems that must operate to assure onsite power capability.

The staff is unable to verify whether the system contains sufficient 7-day inventory.

The applicant is requested to justify that the system volume is sufficient to maintain the seven-day period of engine operation and describe availability time criteria for the cooling water design. The DCD should be updated accordingly.

## REQUEST FOR ADDITIONAL INFORMATION 101-8007

09.05.05-3

10 CFR 52.47(a)(2) requires that a standard design certification applicant provide a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefore, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished.

DCD Tier 2, Section 9.5.5.3 of the diesel engine cooling water system indicates that “[e]ach EDG has a separate and independent EDECWS so that the EDECWS performs the safety function under accident conditions, assuming a single active component failure.”

The staff finds this statement confusing since it seems to indicate that a single active failure of any emergency EDECWS component does not result in EDECWS loss of safety function.

The applicant is requested to clarify how EDECWS can perform its safety function, upon loss of a heat exchanger. (This RAI also applies to other emergency diesel generator (EDG) support system Section 9.5.4, 9.5.6, 9.5.7, and 9.5.8 containing similar statement)

09.05.05-4

The recommendations of NUREG/CR-0660 suggest use of three-way thermostatic valves to direct engine water to the bypass or heat exchanger as required.

DCD Tier 2, Figure 9.5.5-1 shows the use of a three-way thermostatic valve in two locations high temperature and low temperature (HT and LT) circuits. DCD Tier 2, Section 9.5.5.2.2 states that “[t]he three-way thermostat valve splits the cooling water flow so only as much water passes through the heat exchanger as needed to maintain the proper water outlet temperature. The remainder bypasses the heat exchanger and returns directly to the water pump so that the total water flowing through the pump and engine remains essentially constant regardless of the ambient temperature of engine loading.”

This description seems consistent with the HT valve operation, but the LT valve operation is not included in the DCD. DCD Tier 2, Section 9.5.5 lacks a clear description of these three-way thermostatic valves and their operation and function.

The applicant is requested to provide additional details on the system’s use of three-way thermostatic valves and update the DCD accordingly.



**U.S.NRC**

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