

## KHNPDCDRAIsPEm Resource

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**From:** Ciocco, Jeff  
**Sent:** Friday, August 21, 2015 8:57 AM  
**To:** KHNPDCDRAIsPEm Resource  
**Subject:** FW: APR1400 Design Certification Application RAI 107-8039 (18 - Human Factors Engineering)  
**Attachments:** APR1400 DC RAI 107 COLB 8039.pdf; image001.jpg

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**From:** Ciocco, Jeff  
**Sent:** Thursday, July 23, 2015 9:11 AM  
**To:** apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource <KHNPDCDRAIsPEm.Resource@nrc.gov>; Harry (Hyun Seung) Chang <hyunseung.chang@gmail.com>; Yunho Kim <yshh8226@gmail.com>; erin.wisler@aecom.com  
**Cc:** Pieringer, Paul <Paul.Pieringer@nrc.gov>; Junge, Michael <Michael.Junge@nrc.gov>; Ward, William <William.Ward@nrc.gov>; Lee, Samuel <Samuel.Lee@nrc.gov>  
**Subject:** APR1400 Design Certification Application RAI 107-8039 (18 - Human Factors Engineering)

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, the following days to respond to the RAI's questions. We may adjust the schedule accordingly.

18-11: 45 days  
18-12: 60 days

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

Thank you,

Jeff Ciocco  
New Nuclear Reactor Licensing  
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**Hearing Identifier:** KHNP\_APR1400\_DCD\_RAI\_Public  
**Email Number:** 211

**Mail Envelope Properties** (bd3152a983114e8287987278dc53cbb6)

**Subject:** FW: APR1400 Design Certification Application RAI 107-8039 (18 - Human Factors Engineering)  
**Sent Date:** 8/21/2015 8:56:55 AM  
**Received Date:** 8/21/2015 8:56:56 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	1229	8/21/2015 8:56:56 AM
APR1400 DC RAI 107 COLB 8039.pdf		91909
image001.jpg	5056	

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

## REQUEST FOR ADDITIONAL INFORMATION 107-8039

Issue Date: 07/23/2015  
Application Title: APR1400 Design Certification Review – 52-046  
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.  
Docket No. 52-046  
Review Section: 18 - Human Factors Engineering  
Application Section: Staffing and Qualification

### QUESTIONS

18-11

Regulation: Title 10 CFR 50.54(m)(2) specifies staffing requirements to be met by a nuclear power plant licensee.

Evaluation: APR1400-K-I-NR-14005, Rev. 0, Section 4.3.1, "Initial S&Q Assumption" states that the initial S&Q assumption meets the minimum manning requirements of 10 CFR 50.54. This appears to conflict with a second statement in the same section that says the initial staffing assumption is based on the staffing constraint of the HFE program plan. APR1400-E-I-NR-14001, Rev. 0, "Human Factors Engineering Program Plan," Section 4.1, Assumptions and Constraints," lists the control room positions. This list is one Senior Reactor Operator short of minimum manning requirements identified in 10 CFR 50.54.

The S&Q Implementation Plan is also not clear whether the subsequent S&Q analysis could result in control room staffing levels less than the regulatory requirements

Question: Clarify whether minimum control room manning will conform to 50.54(m)(2).

18-12

Evaluation: NUREG-0711, Section 6.4, Criterion 6 lists specific staffing-related issues that should be considered in the staffing and qualification analysis. The staff did not find mention of the following items in the sections identified by the conformance table or in the associated implementation plans.

#### Operating Experience

- initial staffing goals and their bases, including staffing levels of predecessor designs and a description of significant similarities and differences between predecessor and current designs
- possible impact on staffing of requirements of limits to work hours, required break times, and required days off, as specified in 10 CFR 26.205, Work Hours, as part of the Fitness for Duty Rule
- Regulatory Issue Summary (RIS) 2009-10, Communications Between the NRC and Reactor Licensees During Emergencies and Significant Events

#### Task Analysis

- staffing considerations described by the application of ANSI/ANS 58.8-1994, "Time Response Design Criteria for Safety-Related Operator Actions" (ANS, 1994), if used by the applicant

#### Treatment of Important Human Action

- NUREG/CR-6753, Review of Findings for Human Performance Contribution to Risk in Operating Events

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Question: Explain how these issues are used in the staffing analysis. If they are not used, explain why.

