

## RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

### APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

**RAI No.:** 107-8039  
**SRP Section:** 18 – Human Factors Engineering  
**Application Section:** 18.5  
**Date of RAI Issued:** 07/23/2015

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### **Question No. 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

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

**Response**

The specific staffing-related issues in NUREG-0711, Section 6.4, Criterion 6 will be included in the "Staffing and Qualification Implementation Plan" as follows and as indicated on the attached markup.

**Operating Experience**

- Staffing levels and qualification goals and constraints for the APR1400 are based on staffing levels and staff qualifications for predecessor PWRs including 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**

- ANSI/ANS 58.8-1994, "Time Response Design Criteria for Safety-Related Operator Actions" (ANS, 1994).

**Treatment of Important Human Action**

- S&Q analysis evaluate staffing-related issues in NUREG/CR-6753, "Review of Findings for Human Performance Contribution to Risk in Operating Events"

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**Impact on DCD**

There is no impact on the DCD.

**Impact on PRA**

There is no impact on the PRA.

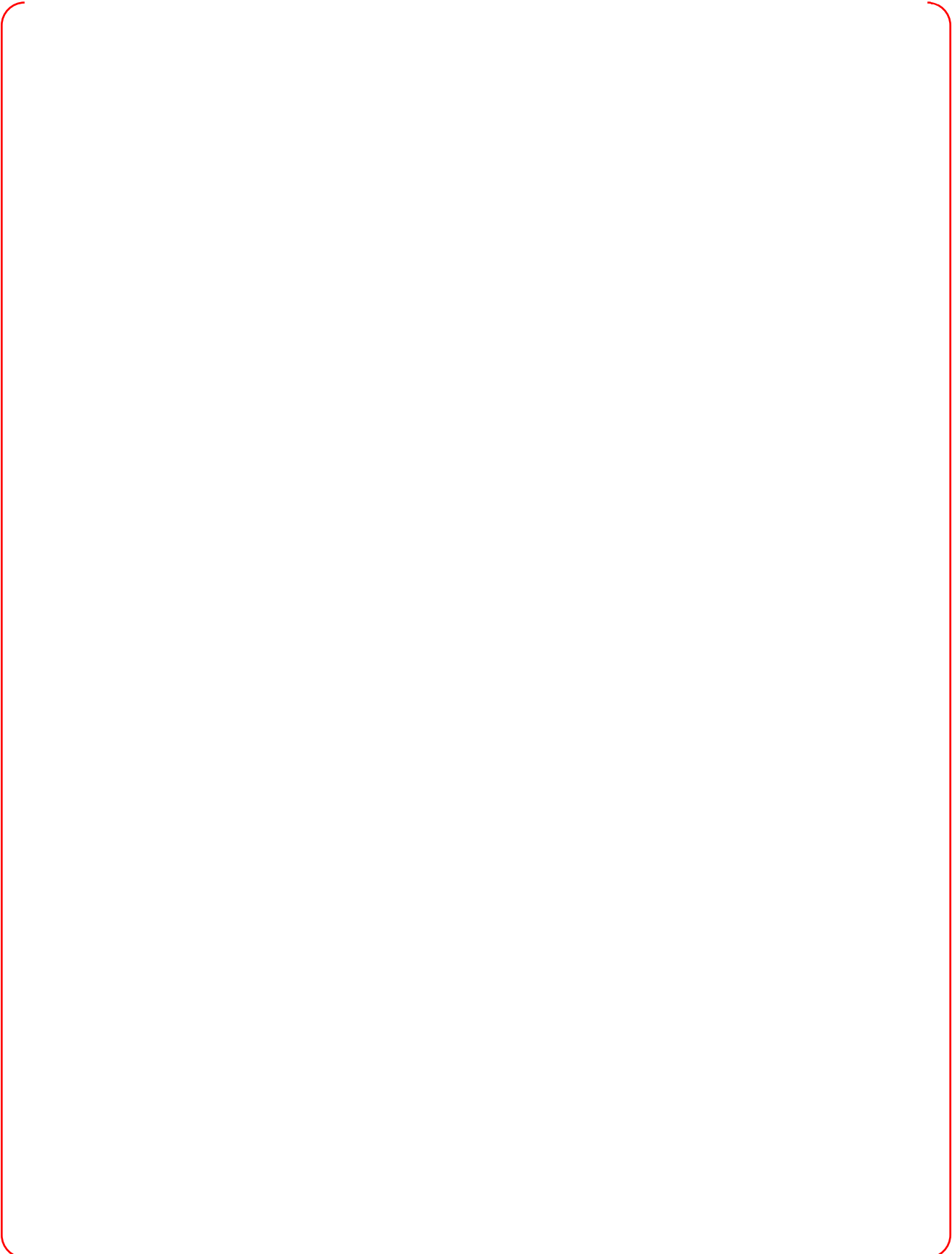
**Impact on Technical Specifications**

There is no impact on the Technical Specifications.

**Impact on Technical/Topical/Environmental Reports**

APR1400-K-I-NR-14005, Rev. 0, "Staffing and Qualifications Implementation Plan," Subsection 4.5 will be revised as indicated on the attached markup.

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## 7. REFERENCES

1. APR1400-E-I-NR-14001-P, "Human Factors Engineering Program Plan," Rev.0, KHNP, December 2014.
2. 10 CFR 50.54, "Conditions of Licenses," U.S. Nuclear Regulatory Commission.
3. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)," U.S. Nuclear Regulatory Commission, various dates and revisions.
4. APR1400-E-I-NR-14004-P, "Task Analysis Implementation Plan," Rev.0, KHNP, December 2014.
5. NUREG/CR-6400, "Human Factors Engineering (HFE) Insights for Advanced Reactors Based upon Operating Experience," U.S. Nuclear Regulatory Commission, January 1997.
6. Information Notice 95-48, "Results of Shift Staffing Study," U.S. Nuclear Regulatory Commission, October 1995.
7. Information Notice 97-78, "Crediting of Operator Actions in Place of Automatic Actions and Modifications of Operator Actions, Including Response Times," U.S. Nuclear Regulatory Commission, October 1997.
8. 10 CFR 50.47, "Emergency Plans," U.S. Nuclear Regulatory Commission.
9. NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," U.S. Nuclear Regulatory Commission, November 2011.
10. NUREG-0711, "Human Factors Engineering Program Review Model," Rev. 3, U.S. Nuclear Regulatory Commission, November 2012.
11. "Combustion Engineering Standard Safety Analysis Report – Design Certification (CESSAR-DC)," Combustion Engineering, Inc., June 1994.

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12. 10 CFR 26, "Fitness for Duty Programs," U.S. Nuclear Regulatory Commission.
  13. RIS 2009-10, "Communications between the NRC and Reactor Licensees during Emergencies and Significant Events," U.S. Nuclear Regulatory Commission, June 2009.
  14. ANSI/ANS 58.8-1994, "Time Response Design Criteria for Safety-Related Operator Actions," American Nuclear Society, 1994
  15. NUREG/CR-6753, "Review of Findings for Human Performance Contribution to Risk in Operating Events", U.S. Nuclear Regulatory Commission, March 2002