KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Monday, January 23, 2017 8:10 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Andy Jiyong Oh; Jungho Kim (jhokim082@gmail.com); James Ross
Cc: Kent, Lauren; Rivera-Varona, Aida; Ward, William; McCoppin, Michael
Subject: APR1400 Design Certification Application RAI 534-8723 (18 - Human Factors Engineering)
Attachments: APR1400 DC RAI 534 HOIB 8723.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,

Jeff Ciocco
New Nuclear Reactor Licensing
301.415.6391
jeff.ciocco@nrc.gov

U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Hearing Identifier: KHNP_APR1400_DCD_RAI_Public
Email Number: 593

Mail Envelope Properties (09a9c530eda849b8af425b85be43ccd9)

Subject: APR1400 Design Certification Application RAI 534-8723 (18 - Human Factors Engineering)
Sent Date: 1/23/2017 8:10:04 AM
Received Date: 1/23/2017 8:10:06 AM
From: Ciocco, Jeff

Created By: Jeff.Ciocco@nrc.gov

Recipients:
"Kent, Lauren" <Lauren.Kent@nrc.gov>
Tracking Status: None
"Rivera-Varona, Aida" <Aida.Rivera-Varona@nrc.gov>
Tracking Status: None
"Ward, William" <William.Ward@nrc.gov>
Tracking Status: None
"McCoppin, Michael" <Michael.McCoppin@nrc.gov>
Tracking Status: None
"apr1400rai@khnp.co.kr" <apr1400rai@khnp.co.kr>
Tracking Status: None
"KHNPDCDRAIsPEm Resource" <KHNPDCDRAIsPEm.Resource@nrc.gov>
Tracking Status: None
"Andy Jiyong Oh" <jiyong.oh5@gmail.com>
Tracking Status: None
"Jungho Kim (jhokim082@gmail.com)" <jhokim082@gmail.com>
Tracking Status: None
"James Ross" <james.ross@aecom.com>
Tracking Status: None

Post Office: HQPWMSMRS08.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	608	1/23/2017 8:10:06 AM
APR1400 DC RAI 534 HOIB 8723.pdf	163869	
image002.jpg	5023	

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

REQUEST FOR ADDITIONAL INFORMATION 534-8723

Issue Date: 01/23/2017
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:

QUESTIONS

18-132

Regulatory Basis

Title 10 of the Code of Federal Regulations (10CFR) Section 52.47(a)(8) requires an applicant for a design certification to provide an FSAR which includes the information necessary to demonstrate compliance with any technically relevant portions of the Three Mile Island requirements set forth in 10 CFR 50.34(f), with certain exceptions. Section 10 CFR 50.34(f)(2)(ii) requires an applicant to "Establish a program, to begin during construction and follow into operation, for integrating and expanding current efforts to improve plant procedures. The scope of the program shall include.....human factors engineering..." The current NRC guidance for developing a human factors engineering (HFE) program is NUREG-0711, Rev 3, "Human Factors Engineering Program Review Model." The applicant stated in the FSAR, Tier 2, Chapter 18 "Human Factors Engineering," that it was working in accordance with the criteria of NUREG-0711 in establishing its HFE program.

NUREG-0711, Criterion 11.4.3.4(3), says, “In selecting personnel for participating in the tests, the applicant should consider the minimum shift staffing levels, nominal levels, and maximum levels, including shift supervisors, reactor operators, shift technical advisors, etc.” Additionally, NUREG-0711, Criterion 11.4.3.2 lists an objective of the integrated systems validation (ISV) is “…validating minimum shift staffing levels.”

Application

APR1400-E-I-NR-14011, “Basic Human System Interface Technical Report” (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15009A212), Section 3.5.1, "Crew Composition," describes the APR1400 control room staffing concept. It is possible that at times when the plant is operating, one senior reactor operator (SRO) and one reactor operator (RO) could be the only personnel in the main control room.

APR1400-E-I-NR-14010, “Human Factors Verification and Validation Scenarios” (ADAMS Accession No. ML15009A226) include the scenarios for the ISV. The staff reviewed the scenarios and found that one of the scenarios described in Section 5.1, “Small Break Loss-of-Coolant Accident with Computer-Based Procedure and Human-System Interface Display Failure, simulates one possible control room staffing level at the start of an event that is less than the nominal staffing level. However, the staff did not find that any of the scenarios had only the minimum control room staff (i.e., only one SRO in the control room and only one RO at the controls) at the start of the event. The NRC staff wants to understand how the ISV will validate the minimum control room staffing level with the existing scenarios.

Question

Please justify why the existing scenarios are sufficient to validate that the minimum number of people that could be in the main control room (i.e., only one SRO in the control room and only one RO at the controls) at the start of an event is sufficient to ensure safe plant operation even though the existing scenarios do not test this staffing level.

Or, please revise the application to ensure that the ISV validates the minimum staffing level in one or more scenarios. If any scenarios are revised to validate the minimum staffing level, please also justify why the scenario or scenarios were selected to validate the minimum staffing level.


U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment