

KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Tuesday, April 26, 2016 10:48 AM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource; Jung-ho Kim (jhokim082@gmail.com); Andy Jiyong Oh; Christopher Tyree
Cc: Foli, Adakou; Zimmerman, Jacob; Wunder, George; Williams, Donna
Subject: APR1400 Design Certification Application RAI 471-8581 (09.05.03 - Lighting Systems)
Attachments: APR1400 DC RAI 471 EEB 8581.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, 45 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



Hearing Identifier: KHNP_APR1400_DCD_RAI_Public
Email Number: 524

Mail Envelope Properties (5ca6a01cf7064711be07c348c4b74c66)

Subject: APR1400 Design Certification Application RAI 471-8581 (09.05.03 - Lighting Systems)
Sent Date: 4/26/2016 10:48:05 AM
Received Date: 4/26/2016 10:48:06 AM
From: Ciocco, Jeff

Created By: Jeff.Ciocco@nrc.gov

Recipients:

"Foli, Adakou" <Adakou.Foli@nrc.gov>
Tracking Status: None
"Zimmerman, Jacob" <Jacob.Zimmerman@nrc.gov>
Tracking Status: None
"Wunder, George" <George.Wunder@nrc.gov>
Tracking Status: None
"Williams, Donna" <Donna.Williams@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
"Junggho Kim (jhokim082@gmail.com)" <jhokim082@gmail.com>
Tracking Status: None
"Andy Jiyong Oh" <jiyong.oh5@gmail.com>
Tracking Status: None
"Christopher Tyree" <Christopher.tyree@aecom.com>
Tracking Status: None

Post Office: HQPWMSMRS07.nrc.gov

Files	Size	Date & Time
MESSAGE	608	4/26/2016 10:48:06 AM
APR1400 DC RAI 471 EEB 8581.pdf		112414
image001.jpg	5040	

Options

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

REQUEST FOR ADDITIONAL INFORMATION 471-8581

Issue Date: 04/26/2016
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 09.05.03 - Lighting Systems
Application Section:

QUESTIONS

09.05.03-15

1. In RAI 8466, Question 09.05.03-10, the staff requested the applicant to provide justifications for normal lighting' illumination levels that are lower than the levels recommended by NUREG 0700. In its response letter dated March 10, 2016, the applicant stated that the illumination levels as previously provided in lux are the typical values for representative areas in the plant. To avoid confusion, the applicant provided the illumination levels in units of foot candles. The staff finds that the lower limits of the ranges of illumination levels in foot candles are lower than the levels recommended by NUREG 0700.

In addition, the applicant stated that the illumination levels of 20-50 foot candles for the emergency diesel generator (EDG) building and the engineered safety features (ESF) equipment rooms is consistent with the illumination levels recommended by NUREG-0700. However, the illumination levels recommended by the NUREG-0700 for the EDG building and ESF equipment rooms is 50 foot candles.

NUREG-0800, Section 9.5.3, "Lighting Systems," states: "The lighting systems will be acceptable if they conform to the lighting levels recommended in NUREG-0700, which is based on the Illuminating Engineering Society of North America (IESNA) Lighting Handbook." NUREG-0700 recommended the following illumination levels for various tasks and work areas:

Control room:

- reading (handwritten (pencil)), writing, and data recording: 100 foot candles
- reading (printed or typed), maintenance area, and wiring area: 50 foot candles
- reading (video display unit): 10 foot candles

In-plant areas:

- Turbine building: 50 foot candles
- Laboratory: 100 foot candles
- ESF equipment: 50 foot candles
- Diesel generator building: 50 foot candles
- Fuel handling building: 50 foot candles
- Reactor building: 50 foot candles

To evaluate the adequacy of the normal lighting for the APR1400, provide justifications for having illumination levels lower than the levels recommended by NUREG-0700 for the above in-plant areas to show that tasks can be accomplished with the lower illumination. Also, provide the illumination levels for the above-mentioned reading, writing, data recording, and maintenance and wiring areas in the main control room.

09.05.03-16

2. In response to RAI 8466, Question 09.05.03-13, the applicant states: "The term "safety-related areas" applies to areas containing equipment or structures required for safe shutdown (including accident mitigation). For more details, refer to DCD Tier 2, Table 3.2-1, note No.(1)." Table 3.2-1 shows that lighting equipment in safety-related areas are seismic category II, and lighting equipment in other areas is seismic category III. The applicant stated in response to RAI 8237, Question 09.05.03-7, that the seismic category II requirements are "not to impact safety-related equipment when subjected to seismic loading of a safe shutdown earthquake [SSE]."

REQUEST FOR ADDITIONAL INFORMATION 471-8581

- a. Since the term "safety-related areas" is specific to the APR1400 DCD, please revise Section 9.5.3.3 the DCD Tier 2 to incorporate the above clarification.
- b. Based on the applicant's definition of safety-related area, the EDG building and the remote shutdown room (RSR) are "safety-related areas" since these areas contain equipment required for safe shutdown. In addition, there are safety-related equipment in the EDG building and the RSR (class 1E switch per Table 3.2-1 (58 of 86)). However, per Table 3.2-1 (39 of 86), lighting equipment/fixtures in both the EDG building and the RSR are classified as seismic category III, contrary to the definition of "safety-related areas" which would classify the lighting in these areas as seismic Category II. Since lighting equipment located in the EDG building and the RSR may impact safety-related equipment in their vicinities when subject to seismic loading of an SSE, explain why lighting equipment in the EDG building and the RSR are not classified as seismic category II. Please revise the DCD with the correct information if necessary.
- c. Table 3.2-1 (39 of 86) indicated that lighting equipment classified as seismic category II is located in safety-related areas, consisting of the main control room, fuel handling area, reactor containment building, auxiliary building, component cooling water heat exchanger building, and essential service water building. Please confirm that lighting equipment in all safety-related areas is classified as seismic category II.



U.S.NRC

United States Nuclear Regulatory Commission

Protecting People and the Environment