

## KHNPDCRAIsPEm Resource

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**Sent:** Thursday, January 28, 2016 7:53 AM  
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**Cc:** Stutzcage, Edward; Burkhart, Lawrence; Vera, John; Lee, Samuel  
**Subject:** APR1400 Design Certification Application RAI 375-8496 (12.03-12.04 - Radiation Protection Design Features)  
**Attachments:** APR1400 DC RAI 376 RPAC 8496.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 the RAI questions. We may adjust the schedule accordingly.

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

Thank you,

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# REQUEST FOR ADDITIONAL INFORMATION 376-8496

Issue Date: 01/28/2016  
Application Title: APR1400 Design Certification Review – 52-046  
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.  
Docket No. 52-046  
Review Section: 12.03-12.04 - Radiation Protection Design Features  
Application Section: 12.3

## QUESTIONS

12.03-49

This question is a follow-up to RAI 8254, Questions 12.03-15, 12.03-18, and 12.03-19.

### REQUIREMENTS AND GUIDANCE

10 CFR 52.47(a)(5) requires that the FSAR contain the kinds and quantities of radioactive materials expected to be produced in the operation and the means for controlling and limiting radioactive effluents and radiation exposures within the limits set forth in 10 CFR 20.

10 CFR 20.1101(b) requires that the licensee use to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA).

SRP 12.3-12.4 indicates that the applicant's radiation monitoring system should be designed to monitor the radiation levels in areas where radiation levels could become significant and where personnel may be present. The SRP also indicates that the reviewer will evaluate the placement of radiation monitors and ensure that each area and airborne radiation monitor should have a local audible alarm and that monitors located in high noise areas should also have visual alarms.

ANSI/ANS-HPSSC-6.8.1-1981, which the applicant references and which is referenced in the SRP indicates that, "Detectors shall be located in those areas which require entry or exit, or both, to be monitored or controlled for purposes of occupational radiation protection which are normally accessible, and where changes in plant conditions can cause significant increases in personnel exposure rate above that expected for the area. Detectors shall be located to best measure the representative exposure rates within the specific area so as to assist in minimizing exposure to personnel."

## ISSUES

1. In the response to RAI 8254, Questions 12.03-15 and 12.03-19, the applicant indicated that the locations of the main steam line radiation monitors (RE-217 through RE-220) and new fuel storage area monitors (RE-245) shown in the FSAR Chapter 11 figures, were not actually the locations of the radiation detector (sensors). Instead the locations shown were the locations of the monitor electronics and display panels. Therefore, the applicant corrected the figures to show the actual location of the radiation detectors for these monitors. Since the initial FSAR showed the locations of the monitor electronics and display panels for these monitors, instead of the actual detector location, it is unclear if the locations of other monitors shown in the Chapter 11 figures are the locations of the actual radiation detector (sensor) or the location of the electronics and monitor displays, or both. In addition, in the response to Question 12.03-18, the applicant also changed the location of monitor RE-234B (Containment Upper Operating Area) without explanation, and it is unclear if this is also due to a similar issue.
  - a. Therefore, in accordance with the SRP and to ensure that the appropriate requirements and guidance are being met, please review all area radiation monitors listed in FSAR Table 12.3-6 and ensure that the location of each monitor in FSAR Figures 11.5-2A through 11.5-2Z provides the accurate location of the actual radiation detector (sensor). If not, please revise the figures, as appropriate, so that the location of each radiation detector (sensor) is shown in the figures. As an alternative to removing the locations of displays the applicant may choose to show the location of both the detectors and the electronics/display in the figures, if it is clear which location is the monitor and which the display.
  - b. Update FSAR Section 12.3.4.1.2 or 12.3.4.1.5 to state that the locations of the area monitors are shown in the FSAR 11.5-2 figures.
  - c. Since in some cases the electronics and display are located in separate rooms from the radiation monitors (sensors), please update the FSAR to provide additional information regarding if the local alarms will alarm at the locations of the radiation detectors, at the location of the electronics/display, or both. Also discuss in the FSAR how the design will ensure that the alarms will be in the appropriate locations to alert plant personnel to leave areas when high

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radiation levels are present and/or to prevent personnel from entering areas when high radiation levels are present, as appropriate. For example, if the alarm is in a separate room from where the detector and source(s) being measured are located, the alarm may not alert workers already in the room of the high radiation levels. Alternatively, it may be appropriate to have an alarm in the entrance room to certain areas with large radiation sources, to prevent workers from entering the area when high radiation levels are present. Ensure that the FSAR is clear where the local alarms will be located for each monitor, as part of the response.

2. In the response to Question 12.03-18, the applicant provides a proposed revision of FSAR Figure 11.5-2A, showing the elevations for the area radiation monitors in containment. However, in the response, the applicant did not provide the elevation of monitor RE-236 (Containment Personnel Access Hatch Area), which is also included in Figure 11.5-2A. In addition, while the applicant shows the elevations of the monitors, they do not provide the physical locations of walls and equipment at each elevation, showing that each monitor is in a location best suited for detecting radiation in the area, which was the intent of Question 12.03-18, Part 1.
  - a. Please include the elevation of monitor RE-236 in Figure 11.5-2A or provide a new figure showing the monitor at the appropriate elevation.
  - b. Please provide an FSAR figure for each elevation of containment for which a monitor is located, showing the monitor's location at that elevation or update the FSAR to specify if the specific monitor elevations and locations shown for all monitors provide a clear view of the area and are at a location best for measuring the representative exposure rates within the specific area in accordance with ANSI/ANS-HPSSC-6.8.1-1981.



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