

## KHNPDCDRAIsPEm Resource

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**Sent:** Tuesday, March 22, 2016 1:42 PM  
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**Subject:** APR1400 Design Certification Application RAI 449-8533 (14.03.08 - Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria)  
**Attachments:** APR1400 DC RAI 449 RPAC 8533.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 RAI question 14.03.08-16. 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 449-8533

Issue Date: 03/22/2016

Application Title: APR1400 Design Certification Review – 52-046

Operating Company: Korea Hydro & Nuclear Power Co. Ltd.

Docket No. 52-046

Review Section: 14.03.08 - Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria

Application Section: Tier 1, Section 2.7.4.2

## QUESTIONS

### 14.03.08-15

10 CFR 50, GDC 61, requires that the fuel storage and handling, radioactive waste, and other systems which may contain radioactivity shall be designed to assure adequate safety under normal and postulated accident conditions. These systems shall be designed (1) with a capability to permit appropriate periodic inspection and testing of components important to safety, (2) with suitable shielding for radiation protection, (3) with appropriate containment, confinement, and filtering systems, (4) with a residual heat removal capability having reliability and testability that reflects the importance to safety of decay heat and other residual heat removal, and (5) to prevent significant reduction in fuel storage coolant inventory under accident conditions.

This is a follow-up to the response to RAI 8054, Question 14.03.08-2.

In Question 14.03.08-2, the staff requested that the applicant provide additional information and ITAAC ensuring that there will be suitable shielding in the spent fuel pool. In the response, the applicant referenced the responses to RAI 8051, Question 09.01.02-8 and RAI 7990, Question 09.01.02-7. Which provided much of the requested information and directed staff to the appropriate ITAAC. However, the information in Tier 1, Section 2.7.4.2 indicates that, "All piping penetrating the spent fuel pool are located approximately 3 m (10 ft) above the top of irradiated fuel assemblies seated in the storage racks and all piping extending down into the spent fuel pool have siphon breaker holes installed on the piping inside the spent fuel pool at or above this level."

RG 1.13, specifies that the minimum pool depth for radiation shielding should be 3 meters (10 feet) above the top of the stored fuel assemblies. In addition, RG 1.13, Regulatory Position 6, specifies that no piping penetrations through the storage pool wall should be below the minimum water level required for shielding.

Therefore, for radiation protection purposes, please either 1) ensure that Tier 1, Section 2.7.4.2, specifies that all piping penetrations are "at least" (instead of "approximately") 10 feet or more above the top of the stored fuel assemblies to ensure that drainage through a piping penetration cannot reduce water level to below 10 feet from the top of the stored fuel assemblies, or 2) provide detailed justification for why it is acceptable for piping penetrations and/or siphon breaker holes to be located less than 10 feet above the fuel assemblies and why radiation shielding will still be adequate.

The staff notes that while having all piping penetrations and siphon breakers at least 10 feet or more above the stored fuel assemblies is acceptable for radiation shielding purposes, there may be more restrictive requirements for ensuring appropriate cooling of spent fuel and appropriate operation of safety systems (see RAI 77-7991, Question 09.01.03-01), and these should be considered and addressed consistently with the response to this RAI.

### 14.03.08-16

This is a follow up to RAI 8054, Question 14.03.08-10.

10 CFR 50.48 requires that the risk of fire-induced radiological hazards to the public, environment, and personnel are minimized.

Regulatory Guide 1.189 states that the plant should maintain the ability to minimize the potential for radioactive releases to the environment in the event of a fire and that radioactive waste buildings, storage areas, and decontamination areas should be separated from other areas of the plant by fire barriers having at least 3-hour ratings.

SRP Section 14.3 indicates that the purpose of inspections, tests, analysis, and acceptance criteria (ITAAC), is to verify that a facility referencing the design certification is built and operates in accordance with the design certification and applicable regulations.

## REQUEST FOR ADDITIONAL INFORMATION 449-8533

In addition, SRP Section 14.3.8 indicates that the reviewer should ensure that Tier 1 identifies and describes, commensurate with their safety significance, those SSCs that provide radiation shielding, confinement or containment of radioactivity, ventilation of airborne contamination, or radiation (or radioactivity concentration) monitoring for normal operations and during accidents.

In RAI 8054, Question 14.03.08-10, the staff requested that the applicant provide an ITAAC to verify that fire and smoke barriers relied on to contain radioactive material releases from significant radiation sources are installed and qualified for their intended use. In the response, the applicant simply proposed adding the following wording to Tier 1 ITAAC Table 2.2.5-1, Item 3;

"Fire and smoke barriers exist to minimize the potential for radioactive releases to the environment from the areas containing significant radiation sources."

The response and proposed ITAAC wording is unacceptable because it does not identify the specific barriers being relied on for radiation protection purposes (such as specific doors, walls, floors, penetration seals), to prevent the release of radioactive material, nor does it describe what the specific design requirement for each barrier is (example, 3 hour fire barrier).

Please provide a DCD revision with an ITAAC that verifies that fire and smoke barriers relied on to contain radioactive material releases from significant radiation sources are installed and qualified for their intended use. The ITAAC should identify the specific barriers being relied on for radiation protection purposes (such as specific doors, walls, floors, penetration seals) to prevent the release of radioactive material, and describe what the specific design requirement for each barrier is.