
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.: 369-8486
SRP Section: 05.02.05 - Reactor Coolant Pressure Boundary Leakage Detection
Application Section: Section 5.2.5
Date of RAI Issue: 01/19/2016

Question No. 05.02.05-3

In the APR1400 Design Control Document (DCD), Tier 1, Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) Table 2.4.7-1, "Leakage Detection System ITAAC," the staff noticed that the acceptance criteria for item 1.e, the acceptance criteria for the containment airborne particulate radioactivity monitor states that it has the capability for detecting a "change in" leakage rate of 1.89 L/min (0.5 gpm) or greater within an hour. Staff noticed that containment sump (1.c) and containment atmosphere humidity (1.d) have the same criteria of being able to detect a "change in" leakage rate of 0.5 gpm or greater within an hour.

In the APR1400 DCD, Chapter 16, "Technical Specifications," Technical Specification (TS) 3.4.12, "Reactor Coolant System (RCS) Operational Leakage," the requirement is that unidentified leakage must be limited to 0.5 gpm. Therefore, staff was wondering if the criteria should be that they need to be able to detect a leakage rate of 0.5 gpm or greater within an hour, instead of a "change in" leakage rate of 0.5 gpm or greater within an hour. (for example, if you were operating with 0.4 gpm unidentified leakage for months, and the leak increased another 0.2 gpm to 0.6 gpm you would want to be able to detect that, correct? Even though it is only a change in 0.2 gpm.)

The applicant is requested to clarify or revise the descriptions above or provide justification for them, and correct the DCD as necessary.

Response

Table 2.4.7-1 Leakage detection System ITAAC of DCD, Tier 1 has an incorrect description for the capability of leakage detection. The Acceptance Criteria for containment sump level monitor and containment airborne particulate radioactivity monitor will be revised to delete "change in" from item No's 1.c and 1.e of Table 2.4.7-1. The containment atmosphere humidity monitor will be deleted from Subsection 2.4.7.1 and the Table 2.4.7-1 as responded to RAI 80-8040, Question 05.02.05-1.

For detail information of leakage detection capability, please refer to the response to RAI 80-8040 Question 05.02.05-1.

Impact on DCD

Subsection 2.4.7.1 and Table 2.4.7-1 of DCD, Tier 1 will be revised as indicated in the attachment associated with this response.

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

There is no impact on any Technical, Topical, or Environmental Report.

APR1400 DCD TIER 12.4.7 Leakage Detection System2.4.7.1 Design Description

The leak detection system for reactor coolant pressure boundary (RCPB) provides a means of detecting and, to the extent practical, identifying the source of reactor coolant leakage and monitoring leakage from the reactor coolant system and associated systems.

1. Indications of unidentified coolant leakage into the containment are provided by containment sump level, and containment airborne particulate radioactivity, ~~and containment atmosphere humidity~~. These instrumentations for leak detection system provide alarms and displays in the MCR indicating reactor coolant pressure boundary leakage.

2.4.7.2 Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.7-1 describes the ITAAC for reactor coolant pressure boundary leakage detection system.

APR1400 DCD TIER 1

Table 2.4.7-1

Leakage Detection System ITAAC

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
<p>1. Indications of unidentified coolant leakage into the containment are provided by containment sump level monitor, containment airborne particulate radioactivity monitor, and containment atmosphere humidity monitor. These instrumentations for leak detection system provide alarms and displays in the MCR indicating reactor coolant pressure boundary leakage.</p>	1.a Inspection will be performed on the as-built VDU in the MCR for retrievability of the reactor coolant pressure boundary leakage detection alarms from the as-built containment sump level instruments, the containment airborne particulate radioactivity monitor, and the containment atmosphere humidity monitor.	1.a Alarms from the as-built reactor coolant pressure boundary leakage detection containment sump level instruments, the containment airborne particulate radioactivity monitor, and containment atmosphere humidity monitor can be retrieved on the as-built VDU in the MCR.
	1.b Inspection will be performed on the as-built VDU in the MCR for retrievability of the displays of containment sump level, containment airborne particulate radioactivity, and the containment atmosphere humidity.	1.b Displays of containment sump level, containment airborne particulate radioactivity, and the containment atmosphere humidity can be retrieved on the as-built VDU in the MCR.
	1.c Testing, by adding water to the as-built containment sump, and analysis, will be performed.	1.c A report exists and concludes that the as-built containment sump level have the capability to detect a change in leakage rate of 1.89 L/min (0.5 gpm) or greater within an hour.
	1.d Testing and analysis of the as-built containment atmosphere humidity monitor will be performed.	1.d A report exists and concludes that the as-built containment atmosphere humidity monitor has the capability to detect a change in leakage rate of 1.89 L/min (0.5 gpm) or greater within an hour.
	1.e Tests and analyses of the as-built containment airborne particulate radioactivity monitor will be performed.	1.e A report exists and concludes that the as-built containment airborne particulate radioactivity monitor has the required sensitivity and response time, which corresponds to the capability for detecting a change in leakage rate of 1.89 L/min (0.5 gpm) or greater within an hour.

and

1.d