
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.: 276-8304
SRP Section: 07.04 – Safe Shutdown Systems
Application Section:
Date of RAI Issue: 10/29/2015

Question No. 07.04-7

Provide inspection, test, analyses, and acceptance criteria (ITAAC) to verify the controls in the remote shutdown room (RSR) for the gaseous waste system and the area radiation monitoring system.

10 CFR 52.47(b)(1) requires that a design certification application contain the proposed ITAAC that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a plant that incorporates the design certification is built and will operate in accordance with the design certification, the provisions of the Atomic Energy Act, and the NRC's regulations. The staff noted the APR1400 FSAR Tier 1 design descriptions for the gaseous waste system and area radiation monitoring system in Tables 2.7.6.2-2, "Gaseous Radwaste System Components List," and 2.7.6.5-1, "Area Radiation Monitoring System Components List," identify displays and control in the RSR for these systems. However, the corresponding ITAAC do not verify these displays and controls in the RSR. Provide ITAAC for FSAR Tier 1, Tables 2.7.6.2-4, "Gaseous Radwaste System ITAAC," and 2.7.6.5-3, "Area Radiation Monitoring System ITAAC," to test the controls and/or displays in the RSR for the gaseous waste system and the area radiation monitoring system.

Response

The remote shutdown room (RSR) has been added to ITAACs in Tables 2.7.6.2-4 and 2.7.6.5-3. Please refer to the attachment associated with this response for the markup to DCD Tier 1.

Impact on DCD

DCD Tier 1, Subsection 2.7.6.2.1, Table 2.7.6.2-4, Subsection 2.7.6.5.1, and Table 2.7.6.5-3 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.

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3. The GRS discharge valve is closed automatically upon detection of a high radiation signal from the radiation monitor at the gaseous waste discharge. The discharge valve is also automatically closed when there is insufficient or no ventilation flow.
4. An alarm from the gaseous waste discharge radiation monitor is provided in the MCR and the radwaste control room.
, the RSR, 
5. The nitrogen injection valve is opened automatically upon receipt of a high oxygen concentration signal above the pre-determined setpoint.
6. The GRS components are classified as RW-IIa and RW-IIc in accordance with NRC RG 1.143 and designed to the corresponding requirements in order to maintain structural integrity under the design basis loads. Component Radiation Safety Classification is summarized in Table 2.7.6.2-3.

2.7.6.2.2 Inspections, Tests, Analysis, and Acceptance Criteria

The inspections, tests, and analyses, and associated acceptance criteria for the gaseous radwaste system is specified in Table 2.7.6.2-4 except for containment penetration isolation valves and piping.

The inspection, tests, analyses, and associated acceptance criteria for the containment penetration isolation valves and piping of GRS are specified in Table 2.11.3-2.

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Table 2.7.6.2-4 (1 of 2)

Gaseous Radwaste System ITAAC

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the GRS is as described in Design Description of Subsection 2.7.6.2.1 and in Tables 2.7.6.2-1 and 2.7.6.2-3 and as shown in Figure 2.7.6.2-1.	1. Inspection of the as-built GRS will be performed.	1. The as-built GRS conforms with the functional arrangement as described in Design Description of Subsection 2.7.6.2.1 and in Tables 2.7.6.2-1 and 2.7.6.2-3 and as shown in Figure 2.7.6.2-1.
2. The GRS charcoal delay beds contain the appropriate type, size, and mass of charcoal needed to facilitate adsorption of radionuclides (xenon and krypton gases) for decay to ensure that the gaseous releases are within the regulatory limits. Moisture instruments are provided for the protection of the charcoal delay beds.	2. Inspection and verification of media in the as-built GRS charcoal beds per design specifications will be performed to verify adsorption efficiency of media.	2. A report concludes that the as-built charcoal delay beds have the adsorption efficiency equal to or greater than the design basis of the charcoal delay beds.
3. The GRS discharge valve is closed automatically upon detection of a high radiation signal from the radiation monitor at the gaseous waste discharge. The discharge valve is also automatically closed when there is insufficient or no ventilation flow.	3. Tests will be conducted for the GRS discharge valve using simulated test signal.	3. Upon receipt of a simulated GRS high radiation test signal, the as-built GRS discharge valve is closed automatically.
4. An alarm from the gaseous waste discharge radiation monitor is 2 provided in the MCR and the radwaste control room.	4. Inspection will be performed for the retrievability of the alarm from the gaseous waste discharge monitor in the as-built MCR.	4. An alarm from gaseous waste discharge radiation monitor can be retrieved in the as-built MCR and the radwaste control room.

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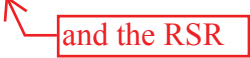
, the RSR, and the radwaste control room

, the RSR,

APR1400 DCD TIER 12.7.6.5 Area Radiation Monitoring System2.7.6.5.1 Design Description

The area radiation monitoring system (ARMS) monitors the radiation levels in selected areas throughout the plant. The area monitors warn operators and station personnel of the visible and audible alarm when unusual radiological events occur.

Components of the ARMS are located in the containment building, the auxiliary building, and the compound building.

1. The functional arrangement of the ARMS is described in the Design Description of Subsection 2.7.6.5.1 and in Table 2.7.6.5-1.
2. The ARMS provides operating personnel with an indication and record of radiation levels in the MCR,  and the RSR.
3. The monitors provide local readout and alarm units at the detector locations.
4. Separation is provided between Class 1E channels, and between Class 1E division and non-Class 1E division.
5. The seismic Category I monitors of the ARMS identified in Table 2.7.6.5-1 can withstand seismic design basis loads without loss of safety function.
6. The safety-related divisional cabinet (SRDC) of the ARMS provides an automatic ESF initiation signals, as shown in Table 2.7.6.5-2.


2.7.6.5.2 Inspections, Tests, Analyses, and Acceptance Criteria

The ITAAC for the area radiation monitoring system is described on Table 2.7.6.5-3.

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Table 2.7.6.5-3 (1 of 2)

Area Radiation Monitoring System ITAAC

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the ARMS is as described in the Design Description of Subsection 2.7.6.5.1 and in Table 2.7.6.5-1.	1. Inspection of the as-built ARMS will be conducted.	1. The as-built ARMS conforms with the functional arrangement as described in the Design Description of Subsection 2.7.6.5.1 and in Table 2.7.6.5-1.
2. The ARMS provides operating personnel with an indication and record of radiation levels in the MCR  and the RSR	2. Inspection of the ARMS components will be performed.	2. It provides operating personnel with an indication and record of radiation levels at selected locations within the various plant buildings to warn of excessive gamma radiation levels in areas where nuclear fuel is stored or handled.
3. The monitors provide local readout and alarm units at the detector locations.	3. Testing of local readout and alarm units at the detectors will be conducted.	3. Local alarms are initiated when the radiation level of integral activated check source reaches a preset limit. Both audible and visual alarms are included for each local readout/alarm unit.
4. Separation is provided between Class 1E division, and between Class 1E division and non-Class 1E division.	4. Inspection of the as-built Class 1E divisions will be performed.	4. Physical separation or electrical isolation exists in accordance with NRC RG 1.75 between these Class 1E divisions, and also between Class 1E division and non-Class 1E division.