
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.: 236-8293
SRP Section: 09.04.01 – Control Room Area Ventilation System
Application Section: 09.04.01
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Question No. 09.04.01-1

10 CFR 52.47(b)(1) requires that a design certification (DC) application contains the proposed inspections, tests, analyses, and acceptance criteria (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 DC is built and will operate in accordance with the DC, the provisions of the Atomic Energy Act, and the NRC's regulations. SRP Section 14.3, "Inspections, Tests, Analyses, and Acceptance Criteria," is used by the staff to evaluate whether the proposed ITAAC comply with 10 CFR 52.47(b)(1). The staff has reviewed DCD Tier 1, Section 2.7.3 and has the following ITAAC-related questions regarding the Control Room HVAC System (CRHS):

1. DCD Tier 1, Tables 2.7.3.1-3, "Acceptance Criteria" 7, requires the CRHS to be "capable of providing the conditioned air to maintain the room temperature within design limits for the CRE [control room envelope] during plant normal, abnormal and accidents conditions." The applicant is requested to revise the ITAAC to specify the parameters to define "design limits".
2. DCD Tier 1, Tables 2.7.3.1-3, "Acceptance Criteria" 8.b, requires the CRHS to "maintain positive pressure in the CRE during the emergency mode." The applicant is requested to revise the ITAAC to be more specific on the definition of positive pressure.
3. DCD Tier 1, Tables 2.7.3.1-3, "Inspection, Tests, Analyses" 11, the unfiltered inleakage test method is not specified. According to DCD Tier 2, Section 9.4.1.4, the applicant states that the unfiltered leakage test is performed in accordance with Regulatory Guide (RG) 1.197 and American Society for Testing and Materials (ASTM) E741-2000, "Standard Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution." The applicant is requested revise the ITAAC to specify ASTM E741 as the required test method.

Response

1. The specific design room temperature limits for the CRE are described in the DCD Tier 2, Section 9.4.1.1 and they vary with the areas in the CRE such as 21.1 °C to 25 °C (70 °F to 77 °F) for main control room, 18.3 °C to 26.7 °C (65 °F to 80 °F) for other support areas, 10°C to 40°C (50 °F to 104 °F) for HVAC equipment rooms. KHNP believes that specifying all the design room temperature limits in the acceptance criteria is excessive, and maintaining current term, “design limits” is adequate.

2. The text, “positive pressure in the CRE” in the DCD Tier 1, Table 2.7.3.1-3, Acceptance Criteria 8.b will be revised to “minimum 3.175 mm (0.125 in) water gauge of positive pressure in the CRE with respect to adjacent areas”.

3. The DCD Tier 1, Table 2.7.3.1-3, Inspection, Tests, Analyses 11 will be revised to include ASTM E741-2000 as the unfiltered inleakage test method.

Impact on DCD

DCD Tier 1, Table 2.7.3.1-3 will be revised as shown in the attachment.

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 Reports.

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Table 2.7.3.1-3 (3 of 5)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
5.c All displays and alarms required by the design exist in the MCR as defined in Tables 2.7.3.1-1 and 2.7.3.1-2.	5.c Inspections will be performed on the displays and alarms in the MCR.	5.c All displays and alarms exist and are retrieved in the as-built MCR as defined in Tables 2.7.3.1-1 and 2.7.3.1-2.
5.d All displays and alarms required by the design exist in the RSR as defined in Tables 2.7.3.1-1 and 2.7.3.1-2.	5.d Inspections will be performed on the displays and alarms in the RSR.	5.d All displays and alarms exist and are retrieved in the as-built RSR as defined in Tables 2.7.3.1-1 and 2.7.3.1-2.
6. The two mechanical divisions of the control room HVAC system are physically separated.	6. Inspection of the as-built mechanical divisions will be performed.	6. The two mechanical divisions of the control room HVAC system are physically separated by a division wall or fire barriers.
7. The control room HVAC system provides the conditioned air that is required to maintain the room temperature within the design limits for the CRE during plant normal, abnormal and accident conditions.	7. Tests and analyses of the as-built control room HVAC system will be performed.	7. A report exists and concludes that the as-built control room HVAC system is capable of providing the conditioned air to maintain the room temperature within design limits for the CRE during plant normal, abnormal and accident conditions.
8. The control room HVAC system removes particulate matter and iodine, and provides system flow as required in the safety analysis.	8.a Testing and analysis will be performed for each ACU filter to determine filter efficiencies.	8.a A report exists and concludes that ACU filter efficiencies are equal to or greater than 99 % for iodine, and equal to or greater than 99 % for particulate matter greater than 0.3 micron.
	8.b Test of the air flow for the as-built control room HVAC system the filtered d.	8.b The as-built control room HVAC system provides filtered the outside makeup air flow of equal to or less than 6,286 cmh (3,700 cfm), filtered the return air flow of minimum 3.175 mm (0.125 in) water gauge of to or more than 7,305 4,300 cfm), and maintains positive pressure in the CRE during the emergency mode.

with respect to adjacent areas

APR1400 DCD TIER 1

Table 2.7.3.1-3 (4 of 5)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
9. Upon detection of radiation in the outside air intakes, the air intake isolation dampers in the air intake having the higher radiation level close automatically.	9. Testing will be performed on the isolation dampers using signals that simulate radiation levels in the outside air intakes.	9. A report exists and concludes that the outside air intake isolation dampers having a higher radiation level in the outside air intakes are closed upon detection of radiation, as a result of having used a signal which simulates radiation levels.
10. In response to ESFAS-SIAS or ESFAS-CREVAS the emergency makeup ACU starts and associated isolation dampers open to direct flow to the ACU.	10. Testing will be performed on the ACU using a simulated ESFAS-SIAS or ESFAS-CREVAS.	10. A report exists and concludes that in response to a simulated ESFAS-SIAS or ESFAS-CREVAS, the ACU starts and ACU inlet isolation dampers and return isolation dampers open.
11. The unfiltered inleakage is within the performance value limit as specified in the safety analysis.	11. Tests and analyses will be performed to verify that as-built unfiltered inleakage is within limits	11. A report exists and concludes that the as-built unfiltered inleakage is less than 510 cmh (300 cfm) in the emergency mode. The
		includes an assumed value of 17 cmh (10 cfm) for CRE ingress/egress.
12. The AHU inlet isolation dampers (PSR) listed in Table 2.7.3.1-1 close within their closure time before the airborne radioactive material passes through the isolation dampers.	12. Test of the as-built AHU inlet isolation dampers (PSR) will be performed using a simulated isolation signal.	12. The AHU inlet isolation dampers (PSR) listed in Table 2.7.3.1-1 close within the 8.4 seconds after receiving a simulated isolation signal.
13.a The fire dampers are installed in the fire rated barriers and have the same fire resistance rating as the barrier.	13.a Type tests, tests, a combination of type tests and analyses, or a combination of tests and analyses of fire damper rating will be performed.	13.a A report exists and concludes that the fire dampers that penetrate the fire barriers have the same fire resistance rating as the barrier.

in accordance with ASTM E741-2000