
REVISED 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.: 329-8424
SRP Section: 14.03.08 – Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria
Application Section: Tier 1
Date of RAI Issue: 12/09/2015

Question No. 14.03.08-13

This is a follow-up To RAI 8054, Question 14.03.08-6.

Regulatory Basis

10 CFR 50, GDC 19 requires that adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the body, for the duration of the accident.

GDC 61, requires that the fuel storage and handling, radioactive waste, and other systems which may contain radioactivity shall be designed with appropriate containment, confinement, and filtering systems.

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. 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.

Information Needed

1. In RAI 8054, Question 14.03.08-6, the staff requested, in part, that the applicant include ITAAC or initial tests, as appropriate, for engineered-safety-feature (ESF) atmosphere cleanup systems to ensure that the total leakage rate from these systems is less than the values assumed in the post-accident dose consequence design basis. In response to this question, the applicant provided tests in the initial test program for leakage from the plant ventilation systems. However, these tests do not specifically ensure that the

total leakage rate from the main control room and technical support center ventilation systems is less than the values assumed in the post-accident dose consequence design basis. FSAR Chapter 15 specifies that unfiltered in-leakage to the main control room and technical support center from the ventilation systems during design basis accidents is assumed to be 8.50 cubic meters per minute. If leakage exceeds this value it is outside the accident dose analysis performed in Chapter 15 and therefore control room operators could receive doses in excess of the 5 rem limit provided in GDC 19. Since the information is necessary to ensure that the facility is built and will be operated in accordance with the design certification, it is appropriate for inclusion in ITAAC. Therefore, please update Tier 1 to include an ITAAC to ensure that the in-leakage to the main control room and technical support center does not exceed 8.50 cubic meters per minute.

2. In response to Question 14.03.08-6, the applicant indicated that tests to ensure that leakage from ductworks and air cleaning unit housings is performed in accordance with TA-4300 of ASME AG-1-2009 with addenda. However, the proposed FSAR updates do not specify which version of ASME AG-1 is being used. Please update the FSAR to specify that the version of ASME AG-1 being referenced is the 2009 version, with addenda, as appropriate.

Response – (Rev. 1)

1. The control room HVAC system serves the areas enclosed within the control room envelope (CRE). The CRE consists of the main control room (MCR), technical support center (TSC), computer room, and other areas as described in DCD Tier 2 Section 6.4.2.1 and shown in Figure 6.4-1. The unfiltered inleakage rate is the total unfiltered inleakage rate into the entire CRE.

DCD Tier 1, Subsection 2.7.3.1.1, Item 11 provides the ITAAC for CRE inleakage. The acceptance criteria for Item 11 is that the unfiltered inleakage must be less than 170 cmh (100 cfm) in the emergency mode.

The inleakage test method is described in DCD Tier 2, Subsection 14.2.12.1.95, which is the initial plant test program of the control room HVAC system. The [total unfiltered inleakage rate to the CRE described in the acceptance criteria of DCD Tier 2, Subsection 14.2.12.1.95](#) will be revised to change from 510 cfm (300 cfm) to 170 cmh (100 cfm).

2. DCD, Tier 2 Subsections will be revised to include ASME AG-1-2009 with addenda as the appropriate version.

Impact on DCD

The changes that were proposed in the original response to this RAI have been incorporated into Revision 2 of the DCD; therefore, only the pages containing proposed changes as a result of Revision 1 of this response are included in the attachment.

[DCD Tier 2, Subsection 14.2.12.1.95 will be revised as indicated 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 Report.

APR1400 DCD TIER 2

- 4.7 Filter and carbon adsorber data
- 4.8 Control room HVAC system radiation monitor performance data

5.0 ACCEPTANCE CRITERIA

- 5.1 The control room HVAC system operates its functions as described in Subsections 6.4.2 and 9.4.1.
- 5.2 The control room HVAC system radiation monitors perform as described in Table 11.5-1.
- 5.3 The control room HVAC system maintains CRE integrity.
- 5.4 The ASTM E741-00 tests confirm that total unfiltered inleakage rate to the CRE is less than ~~510 cmh (300 cfm)~~ in the emergency mode.

14.2.12.1.96

Turbine Generator Building HVAC System Test

170 cmh (100 cfm)

1.0 OBJECTIVES

- 1.1 To demonstrate the manual and automatic operation of units
- 1.2 To demonstrate status of lights and alarms
- 1.3 To demonstrate the Fans are operating at design capacities

2.0 PREREQUISITES

- 2.1 Construction activities on the turbine building HVAC system have been completed.
- 2.2 Turbine building HVAC system instrumentation has been calibrated.
- 2.3 Support systems required for operation of the turbine building HVAC system are complete and operational.
- 2.4 Test instrumentation is available and calibrated.