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.: **357-8344**

SRP Section: **06.02.04 – Containment Isolation System**

Application Section: **6.2.4**

Date of RAI Issue: **01/05/2016**

Question No. 06.02.04-10

Clarify use of resilient seals on containment vent and purge valves and accommodations for seal replacement if supplied.

In order to evaluate if requirements of General Design Criteria (GDC) 54, as it relates to the ability to test the operability of isolation barriers, are met and to determine if valve leakage is within acceptable limits, specify in the DCD (or state where in the DCD it is specified) if the containment purge and vent valves will be supplied with resilient seals. If supplied, specify in the DCD what accommodations are provided for resilient seal replacement when required by leakage rate testing or manufacturer recommendation.

Response

DCD Tier 2, Subsection 9.4.6.4.2, “Reactor Containment Building Purge System” will be revised to describe the use of resilient seals on containment isolation valves in the reactor containment building purge system and provisions for seal replacement.

Impact on DCD

DCD Tier 2, Subsection 9.4.6.4.2 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.

ASME Section VIII. The cooling coil performance rating is developed in accordance with AHRI standards (References 13, 14, and 15).

Leak testing of system ductwork is performed in accordance with the ASME N511 and ASME AG-1.

~~The safety-related isolation valves are inspected periodically and the valve seats are replaced when required.~~

9.4.6.5 Instrumentation Requirements

9.4.6.5.1 Reactor Containment Building HVAC System

The following instrumentation is provided in the MCR and RSR.

a. Indication – status of RCFC fans, reactor cavity AHU fans, and fans

b. Indication - RCFC inlet and outlet temperature

c. Indication – RCFC fan motor vibration

d. reactor cavity AHU inlet and outlet temperature

e. Indication – reactor cavity temperature

f. Indication – CEDM cooling fan outlet air temperature

g. Alarm – RCFC inlet temperature high

h. Alarm – RCFC outlet temperature low

i. Alarm – RCFC fan motor vibration high

j. Alarm – reactor cavity temperature low and high

The CIVs are supplied with resilient seals. These seals are replaced according to the manufacturer's recommendations and when required by leakage rate testing. Testing of CIVs to verify operability and ability to meet closing requirements is described in Subsection 6.2.4. Inservice inspection of Class 2 components is described in Section 6.6.

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Question No. 06.02.04-12

Clarify containment isolation provisions meet the intent of Regulatory Guides (RGs) 1.11 and 1.141.

DCD Tier 2, Section 6.2.4.1 indicates that instrument and control (I&C) sensing lines that penetrate the containment are provided with containment isolation provisions that meet the intent of NRC RGs 1.11 and 1.141. Please clarify in the DCD what is meant by “meet the intent of RG 1.11 and RG 1.141”. If the containment isolation provisions for some I&C sensing lines meet the isolation guidelines on some other defined bases not indicated in RGs 1.11 and 1.141, please clearly state and justify the reasons in the DCD.

Response

I&C sensing lines that penetrate the containment are provided with containment isolation provisions that meet the requirements of NRC RG 1.11 and NRC RG 1.141. DCD Tier 2, Subsections 6.2.4.1.1 and 6.2.4.1.2 will be revised accordingly.

Impact on DCD

DCD Tier 2, Subsections 6.2.4.1.1 and 6.2.4.1.2 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.

a. One locked closed isolation valve inside and one locked closed isolation valve outside containment, or

b. One automatic isolation valve inside and one locked closed isolation valve outside containment, or

c. One locked closed isolation valve inside and one automatic isolation valve outside containment. A check valve is not used as the automatic isolation valve outside containment, or

d. One automatic isolation valve inside and one automatic isolation valve outside containment. A check valve is not used as the automatic isolation valve outside containment.

These provisions satisfy GDC 56 (Reference 25).

Lines that penetrate the containment and are not part of the RCPB and are not connected directly to the containment atmosphere are referred to as Type III and have at least one isolation valve, located outside the containment, which is (a) automatic, (b) locked closed, or (c) capable of remote manual operation. A check valve is not used as the automatic isolation valve.

These provisions satisfy GDC 57.

Instrumentation and control sensing lines that penetrate the containment are provided with containment isolation provisions that meet the ~~intent~~ of NRC RG 1.11 (Reference 26) and NRC RG 1.141 (Reference 41).

requirements

6.2.4.1.2 Design Features

The following is a summary of containment isolation system design features. Incorporation of these features into the containment isolation system results in a design where the design criteria for containment isolation barriers given above are met:

h. Valve operators and power sources are selected for containment isolation valves consistent with their required safety function.

i. Instrumentation and control sensing lines that penetrate the containment are provided with containment isolation provisions, which meets the ~~intent~~ of NRC RG 1.11 and NRC RG 1.141 requirements

j. All containment penetrations not used for accident mitigation or safe shutdown are automatically isolated by a CIAS unless:

1) The valves are normally locked closed.

2) The penetrations are normally sealed (e.g., fuel transfer tube).

3) The lines are needed for RCP operation (RCP seal injection and component cooling water to RCP seal coolers, motors, and lube oil coolers).

The exception of the lines for RCP operation allows the RCPs to be available for accident mitigation or safe shutdown if offsite power and non-essential support systems are available. These lines are continuously monitored for radiation and can be manually isolated from the MCR.

k. The induced stresses in the pressure retaining components of the CIVs, due to an internal containment pressure of less than or equal to 7.67 kg/cm^2 (109 psig), are within the ASME Section III Factored Load Category.

6.2.4.2 System Design

No single flow diagram shows all of the containment penetrations, but they are shown on appropriate flow diagram for systems. Containment isolation provisions are tabulated in Table 6.2.4-1. The appropriate valve arrangements are illustrated in Figure 6.2.4-1.

All valves that receive an ESFAS are designed and tested with closing time appropriate to the function performed. The sequencing system for loading the onsite emergency