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## 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.:** 254-8270  
**SRP Section:** 11.02 – Liquid Waste Management System  
**Application Section:** 11.2  
**Date of RAI Issue:** 10/19/2015

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### **Question No. 11.02-7**

10 CFR 50 Appendix A GDC 1 and 2 as they relate to Quality Assurance standards and identification of structures systems and components important to safety must be designed to withstand the effects of natural phenomena. 10 CFR 50 Appendix A GDC 60 and Regulatory Guide 1.143 as they relate to the control of release of radioactive materials and the radwaste system safety classifications must be applied here.

Staff review of DCD section 10.4.8 indicates that insufficient details are provided to describe the boundaries of the systems and their corresponding safety classifications. Staff is seeking sufficient details describing the radwaste systems including their respective isolation components. Currently the Staff is unable to determine if each system's isolation components are also included in the safety classification for the systems. DCD section 10.4.8.1.2 that states:

“The safety classification for the SGBS components applies to components up to and including the nearest valves, fittings, and/or welded/flanged nozzle connections.” This does not provide a description of isolation components in the description of LWMS systems.

DCD Section 11.3.1.3 clarifies this stating:

“The safety classification for the GRS components applies to components, up to and including the nearest isolation valves, fittings, and/or welded/flanged nozzle connections.”

Each radwaste SSC classifications need to address the following information:

1. All components connected to a component classified as a RW-IIa (ex. Piping, pumps, etc) are also classified as RW-IIa, up to and including the nearest isolation component (ex. Isolation valves), on each connection, to the RW-IIa component.
2. All components connected to a component classified as a RW-IIb (ex. Piping, pumps, etc) are also classified as RW-IIb, up to and including the nearest isolation component (ex. Isolation valves), on each connection, to the RW-IIb component.

3. All components connected to a component classified as a RW-IIc (ex. Piping, pumps, etc) are also classified as RW-IIc, up to and including the nearest isolation component (ex. Isolation valves), on each connection, to the RW-IIc component.

Please address the items above and provide a mark-up on the proposed DCD changes.

### **Response**

Section 10.4.8.1.2 will be revised to address the system component boundary for each radwaste safety classification.

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#### **Impact on DCD**

DCD Tier 2 Section 10.4.8.1.2 will be revised as indicated in the attached markup.

#### **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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classification is summarized in Table 10.4.8-1. Accordingly, the SGBS is classified as RW-IIc, based on the highest safety classification for the components within the system boundary. The SGBS components are housed within the auxiliary building designed as seismic Category I, which exceeds seismic design requirements for radwaste safety classification RW-IIc.

The safety classification for the SGBS component applies to the components, up to and including the nearest valves, fittings, and/or welded/flanged nozzle connections.

isolation

- b. The quality assurance (QA) program for the design, installation, procurement, and fabrication of SGBS components conforms with Regulatory Position C.7 of NRC RG 1.143.
- c. The SGBS is designed and tested to the codes and standards listed in Table 10.4.8-3 in accordance with Regulatory Positions C.1.1.1 and C.4 of NRC RG 1.143.

The SGBS follows the ALARA design and operational approach described in Sections 12.1 and 12.3 in accordance with NRC RG 8.8 (Reference 19). The SGBS' demineralizers are located in a shielded area to reduce the occupational radiation exposure (ORE).

#### 10.4.8.2 System Description

##### 10.4.8.2.1 General Description

SGBS schematic diagrams are shown in Figure 10.4.8-1. Classification of SGBS equipment and components is shown in Section 3.2.

The blowdown subsystem (BDS) consists of blowdown piping connected to each SG, a blowdown flash tank, a regenerative heat exchanger, two pre-filters, two demineralizers, a post-filter, and control valves. The wet lay-up subsystem (WLS) consists of two recirculation trains (one for each SG) and shares filters and demineralizers with the BDS.

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### **Question No. 11.02-8**

10 CFR 50, Appendix A, Criterion 61, requires that the fuel storage and handling, radioactive waste, and other systems which may contain radioactivity be designed to assure adequate safety under normal and postulated accident conditions, with suitable shielding for radiation protection, and with appropriate containment, confinement, and filtering systems.

In addition, Regulatory Guide 1.143, Revision 2, provides design specifications for steam generator blowdown (SGBS) and radwaste SSCs.

FSAR Section 10.4.8.1.2 states that “The SGBS components are housed within the auxiliary building designed as seismic Category I, which exceeds seismic design requirements for radwaste safety classification RW-IIc.” However, Regulatory Position 5 of Regulatory Guide 1.143 indicates that structures (buildings) are classified and designed based on the total unmitigated radiological release at the protected area boundary and total unmitigated exposure to personnel. While Table 2 of Regulatory Guide 1.143 provides design requirements for RW-IIa, RW-IIb, and RW-IIc structures, Regulatory Position 5 only provides two options for building classification (RW-IIa and RW-IIb). While unmitigated radiological release and exposure calculations are necessary to determine the classification of structures, if the structure is classified as RW-IIa or exceeds the requirements of RW-IIa, no calculation is necessary because the structure meets or exceeds the maximum criteria in the regulatory guide.

Therefore, please revise the statement to indicate that the building meets or exceeds the design requirements (not only seismic requirements) of RW-IIa.

Please address the items above and provide a mark-up on the proposed DCD changes.

**Response**

Section 10.4.8.1.2 and Table 3.2-1 will be revised to indicate the radwaste safety classification of the auxiliary building is RW-IIa.

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**Impact on DCD**

DCD Tier 2 Section 10.4.8.1.2 and Table 3.2-1 will be revised as indicated in the attached markup.

**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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classification is summarized in Table 10.4.8-1. Accordingly, the SGBS is classified as RW-IIc, based on the highest safety classification for the components within the system boundary. The SGBS components are housed within the auxiliary building ~~designed as seismic Category I, which exceeds seismic design requirements for radwaste safety classification RW-IIc.~~ ,which is classified as RW-IIa.

The safety classification for the SGBS component applies to the components, up to and including the nearest valves, fittings, and/or welded/flanged nozzle connections.

- b. The quality assurance (QA) program for the design, installation, procurement, and fabrication of SGBS components conforms with Regulatory Position C.7 of NRC RG 1.143.
- c. The SGBS is designed and tested to the codes and standards listed in Table 10.4.8-3 in accordance with Regulatory Positions C.1.1.1 and C.4 of NRC RG 1.143.

The SGBS follows the ALARA design and operational approach described in Sections 12.1 and 12.3 in accordance with NRC RG 8.8 (Reference 19). The SGBS' demineralizers are located in a shielded area to reduce the occupational radiation exposure (ORE).

#### 10.4.8.2 System Description

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Table 3.2-1 (85 of 86)

and the auxiliary building, in which the radioactive waste management systems (LWMS, GWMS, and SWMS) and the components for the SGBD system are housed respectively,

- (4) Designed in accordance with NRC RG 1.143. The radwaste facilities, including the structures, systems, and components, are designed to meet the design basis loads, including the natural phenomena and internal and/or external man-induced hazards design criteria, in accordance with NRC RG 1.143.
- The radwaste safety classifications for the radioactive waste management systems: LWMS, GWMS, SWMS, and the SGBD systems and components, are presented in Sections 11.2, 11.3, 11.4, and 10.4.8, respectively.
  - The radwaste safety classification for the compound building, ~~in which the LWMS, GWMS, and SWMS are housed,~~ is RW-IIa in accordance with the guidance in RG 1.143. Radwaste treatment structure classified as Class RW-IIa is designed and constructed to meet the requirements of ACI 349 and AISC N690.
  - ~~The components for the SGBD system are housed in the auxiliary building. The seismic design requirements for the auxiliary building exceed those for the radwaste safety classification. The seismic design loads for the building housing the SGBD system shall follow those for the auxiliary building.~~
- (5) Designed based on guidance contained in NRC NUREG-0696 and NUREG-0737, Supplement 1.
- (6) Security system requirements per 10 CFR 73.
- (7) IEEE 497 endorsed by NRC RG 1.97 post-accident monitoring parameters. Instrumentation meets qualification and quality requirements of this NRC RG and IEEE 497.
- (8) Guidance per NUREG-0718 and NRC RG 1.47.
- (9) Earthquake monitoring is per NRC RG 1.12.
- (10) Design guidance per NRC RG 1.13.
- (11) Design guidance per NRC RG 1.13, NUREG-0554, and NUREG-0612.
- (12) Design guidance per NRC RG 1.189.
- (13) The entire crane, including the bridge and trolley, is designed and constructed in accordance with NRC RG 1.29.
- (14) Non-safety-related diverse protection system per 10 CFR 50.62 and GL 85-06.
- (15) Non-safety-related ACUs and components, including fan/motor and associated isolation dampers, are designed and constructed per NRC RG 1.140.
- (16) Design guidance per NRC RG 1.45.
- (17) These codes and standards are applied to requirements of interface design.

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