
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.: 88-8046
SRP Section: 03.05.02 – Structures System and Components To Be Protected From Externally-Generated Missiles
Application Section: 3.5.2
Date of RAI Issue: 07/20/2015

Question No. 03.05.02-3

In the review of DCD Tier 2 Table 3.5-4, the staff found several items that need further clarification. For this reason, the staff requests the applicant to address the following items:

- a) DCD Tier 2, Section 3.5, states “Essential SSCs outside containment to be protected from missiles are provided in Table 3.5-4.” However, the title of Table 3.5-4 is “Essential Systems and Components to Be Protected from Externally Generated Missiles.” It is unclear to the staff if Table 3.5-4 is also applicable to internally-generated missiles. The applicant is requested to revise either the statement in the DCD or the title of Table 3.5-4.
- b) It is unclear to the staff whether this table is meant to be an all inclusive list containing all SSCs requiring protection against missiles. For example, RG 1.117, Appendix A specifies that any SSC required for attaining safe shutdown should be protected against external missiles. DCD Tier 2, Section 7.4 contains a list of systems required to achieve and maintain the reactor shutdown; however, some systems are not listed in DCD Tier 2, Table 3.5-4 (e.g., auxiliary feedwater system). The staff requests the applicant to clarify the purpose of Table 3.5-4 and whether there are SSCs requiring missile protection that are not listed in Table 3.5-4.
- c) DCD Tier 1, Section 2.2.2.1 states that the EDG building is designed and constructed to withstand external events, including tornados and hurricanes. DCD Tier 2, Section 8.3.1.1.4, item d, states that Class 1E EDGs and associated equipment are located in separate rooms of the auxiliary building and EDG building. However, DCD Tier 2, Table 3.5-4 does not list the EDG building as a structure necessary to protect essential SSCs.

DCD Tier 1, Section 2.2.4, states the exterior walls and roof of the compound building are credited with providing missile protection; however, Table 3.5-4 does not include the compound building as a structure performing a missile barrier function.

The applicant is requested to include the EDG building and compound building in DCD Tier 2 Table 3.5-4 as a structure credited as a missile barrier.

Response – Rev. 2

- a) The title of Table 3.5-4 will be revised to “Essential Systems and Components Outside the Reactor Containment Building to be Protected from Externally Generated Missiles” since the table does not include internally generated missiles.
- b) The purpose of Table 3.5-4 is to provide the essential SSCs outside of the reactor containment building in accordance with R.G 1.117 Appendix A. The auxiliary feedwater system will be included in Table 3.5-4. Upon performing a review of the table, the nomenclature of other SSCs was not accurate and will also be corrected. [The regenerative heat exchanger and letdown heat exchanger will be deleted from Table 3.5-4 since they are located inside the reactor containment building. The boric acid storage tank is located in the yard and will be added to Table 3.5-4 to clarify the location and that it is missile protected.](#)
- c) The EDG building and the compound building will be included in DCD Tier 2, Table 3.5-4. It has been determined that the compound building does provide a function to protect the radwaste treatment facilities from externally generated missiles in accordance with RG.1.143, RG 1.115 and RG 1.117.

Impact on DCD

DCD Tier 2, Table 3.5-4 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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3.5 Missile Protection

In accordance with 10 CFR Part 50, Appendix A, GDC 2 and 4 (Reference 1), essential structures, systems, and components (SSCs) important to safety are required to be protected from internal and external missiles.

Missile protection is provided for safety-related equipment and components so that internal and external missiles do not cause the release of significant amounts of radioactivity or prevent the safe and orderly shutdown of the reactor.

The protection of safety-related SSCs is accomplished by one or more of the following:

- a. Minimizing the sources of missiles by equipment design features that prevent missile generation
- b. Orienting or physically separating potential missile sources away from safety-related equipment and components
- c. Containing the potential missiles through the use of protective shields or barriers near the missile source or safety-related facility and equipment
- d. Hardening of safety-related equipment and components to withstand missile impact when such impacts cannot be reasonably avoided by the methods listed above

Table 3.2-1 is the list of SSCs. Essential SSCs outside ~~containment~~ to be protected from ~~missiles~~ are provided in Table 3.5-4. SSCs located inside the seismic Category I containment building are protected from missiles outside ~~containment~~ by thick concrete walls and are therefore omitted. General arrangement drawings showing locations of the SSCs are given in Section 1.2.

externally generated missiles

3.5.1 Missile Selection and Description

For equipment with energy sources capable of generating a missile, the selection is based on the application of a single failure criterion to the retention features of the component.

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Table 3.5-4

Outside Reactor Containment Building

Essential Systems and Components to Be Protected from Externally Generated Missiles

Protected Components	Missile Barrier
Chemical and Volume Control System Regenerative heat exchanger Letdown heat exchanger Charging pump mini-flow heat exchanger Control volume tank ← Volume control tank Charging pump (auxiliary charging pump) Boric acid storage tank Safety-related pipes and valves	Auxiliary Building The BAST located in Yard is designed to withstand externally generated missiles.
Class 1E electric systems, including on-site safety-related portions of the Emergency Diesel Generator System necessary to provide emergency electric power to the other systems identified in this table.	Auxiliary Building ← and EDG Building
Spent Fuel Pool Cooling Cleanup system Spent Fuel Pool Heat Exchanger ← Cooling Spent Fuel Pool Clean Up Pump Safety-related Pipes and Valves	Auxiliary Building
Main Steam System MSIVs and pipe between MSIVs and containment	Auxiliary Building
Shutdown Cooling System Shutdown Cooling Pump and Heat Exchanger RCPB Pipes and Valves	Reactor Containment and Auxiliary Building
Essential Service Water System Essential Service Water Pump Safety-related Pipes and Valves	ESW Building
Control Room HVAC System AHU, ACU ← Isolation Control, Isolate and Smoke Damper	Auxiliary Building
Component Cooling Water System Component Cooling Water Heat Exchanger Component Cooling Water Pump Component Cooling Water Makeup Pump Safety-related Pipes and Valves	Component Cooling Water Heat Exchanger Building
Auxiliary Feedwater System Auxiliary Feedwater Pump Auxiliary Feedwater Storage Tank Safety-related Pipes and Valves	Auxiliary Building

Safety-related

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2.2.4 Compound Building2.2.4.1 Design Description

The compound building is a non safety-related seismic Category II reinforced concrete structure which is located adjacent to the auxiliary building. The compound building houses the access control area, the hot machine shop, the radwaste treatment and drum removal areas, and the operation support center (OSC). The building is composed of reinforced concrete shear walls, interior walls, concrete slabs, girders and columns. The exterior shear walls and roof slabs play a role as a radiation shielding ~~and missile protection.~~

1. The seismic Category II compound building structure does not impair the ability of the safety-related SSCs to perform their safety-related functions.

and missile protection.

2.2.4.2 Inspection, Test, Analyses, and Acceptance Criteria

The inspections, tests, analyses, and associated acceptance criteria for the compound building is specified in Table 2.2.4-1.