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.:	**72-8020**
SRP Section:	**03.02.02 – System Quality Group Classification**
Application Section:	**3.2.2**
Date of RAI Issue:	**07/15/2015**

Question No. 03.02.02-3

The definitions of Quality Groups A, B, C, and D do not appear consistent with the guidance of RG 1.26 and the other guidance referenced in the SRP. For instance, the definition of Quality Group A does not clearly comply with the language in 10 CFR 50.55a, which states, in part, that components that are part of the reactor coolant pressure boundary must be Quality Group A unless failure of the component during normal reactor operation would not prevent the reactor to be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system. In Page 3.2-6 of DCD Section 03.02.02, the applicant discusses the “loss of enough reactor coolant to prevent orderly shutdown and cooldown,” but this does not capture the full scope of the regulation. The applicant has stated that the quality groups are assigned in accordance with RG 1.26, but the text does not appear consistent.

Please observe and incorporate the guidance into the definitions of quality groups, or justify why exception is taken to the guidance.

Response – (Rev. 1)

The definition of Quality Group in Subsection 3.2.2 of DCD Tier 2 will be revised to be consistent with the guidance of RG 1.26. The revision to the original response is being submitted to ensure consistency with RG 1.26 and revises the originally proposed changes to DCD Subsection 3.2.2 to provide the following:

a. A change to the terminology pressure-retaining components to water-, steam-, and radioactive-waste-containing components,

b. A clarification of the Quality Group A definition to align with the draft revision 5 of RG 1.26,

c. The addition of a footnote to Quality Group C that was not included in the original markup and also the addition of missing constraints for subpoint d that specifies how the 0.5 rem is conservatively calculated.

Also, reference to component supports in the quality groups is being removed in accordance with the revised response that was submitted for RAI 30-7927 Question 03.02.02-2 (Reference MKD/NW-16-0227L dated April 16, 2016).

Impact on DCD

Subsection 3.2.2 of DCD Tier 2 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 Report.

The quality group classifications and codes and standards for mechanical and fluid systems and components are listed in Table 3.2-1 and are shown on the applicable flow diagrams. The flow diagrams identify the classification boundaries of interconnecting piping and valves, as well as the interfaces between the safety-related and non-safety-related portions of each system. The COL applicant is to identify the quality group classification of site-specific systems and components and their applicable codes and standards (COL 3.2(2)).

Quality Groups A through E and G are defined below.

Quality Group A (ASME Section III, Subsection NB)

Quality Group A applies to RCPB components whose failure could cause a loss of enough reactor coolant to prevent orderly reactor shutdown and cooldown, assuming makeup is provided only by the normal makeup systems. Normal makeup systems are systems that are normally used to maintain reactor coolant inventory during startup, hot standby, power operation, and cooldown using onsite power.

Quality Group B (ASME Section III, Subsection NC)

Quality Group B applies to the containment building, components in the RCPB not in Quality Group A, and the components of safety systems that are necessary to perform the following:

a. Remove heat directly from the reactor or containment building

b. Circulate reactor coolant for safety-related purposes

c. Control radioactivity released within the containment building

d. Control hydrogen concentrations in the containment building atmosphere

e. Introduce emergency negative reactivity to make the reactor subcritical or restrict the addition of positive reactivity (e.g., safety injection system)

Replace this with the attached "Replacement"

f. Provide or maintain sufficient reactor coolant inventory for emergency core cooling (e.g., IRWST)

Quality Group B safety systems include the following:

a. The containment, including those valves and components of closed systems used to effect isolation of the containment atmosphere from the outside environs

b. Shutdown cooling system (SCS)

c. Portions of the auxiliary systems that form a reactor coolant letdown and makeup loop

d. Containment spray system (CSS)

e. The containment building air cleanup system and the portions serving as extensions of the containment building during air cleanup recirculation after an accident

f. Portions of the steam and main feedwater system (MFS) extending from and including the secondary side of the steam generator (SG) up to and including the wall penetration anchors beyond the outermost containment isolation valves

g. Containment hydrogen control system

Quality Group C (ASME Section III, Subsection ND)

Quality Group C applies to ASME Section III components that are not in Quality Qroup A or B and the components of safety systems that are necessary to perform the following:

a. Release to the environment radioactive gases normally required to be held for decay if they fail

b. Provide or support a safety system function

Replace this with the attached "Replacement"

c. Control the airborne radioactivity released outside the containment building

d. Provide or maintain sufficient reactor coolant inventory for core cooling (e.g., reactor coolant normal makeup function)

e. Introduce negative reactivity to achieve or maintain subcritical reactor conditions (e.g., boron makeup function)

f. Remove decay heat from spent fuel

Quality Group C safety systems include the following:

a. Portions of the auxiliary system that provide boric acid to the reactor coolant

b. Portions of the cooling water systems that cool other safety systems, the MCR, and safety-related electrical components

c. Spent fuel pool (SFP) cooling system

d. Condensate storage tanks

e. Air cleanup systems other than those listed under Quality Group B (e.g., MCR, fuel building air cleanup)

f. Portions of the auxiliary systems that form the purification section of the letdown loop

g. Portions of the radioactive waste processing system

h. Onsite emergency power supply supporting auxiliary systems

Quality Group D

Replace this with the attached "Replacement"

Quality Group D applies to non-safety-related systems and components that are not covered under Quality Group A, B, or C and that are designed to ASME B31.1 (Reference 13) code

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Replacement

Quality Group A applies to the components that are part of the reactor coolant pressure boundary (RCPB), except for the portions that are included in Quality Group B below. This exclusion applies to components whose failure would not prevent the reactor from being shut down and cooled down in an orderly fashion with normal makeup and components that are or can be isolated from the reactor coolant system by two valves in series (with automatic closure of open valves).
Quality Group A water-, steam-, and radioactive-waste-containing components are designed to meet the requirements for Class 1 components in ASME Section III, Division I, Subsections NB.

Quality Group A

~~Quality Group A applies to RCPB components whose failure would not prevent the reactor from being shut down and cooled down in an orderly manner with normal makeup and components that are or can be isolated from the reactor coolant system by two valves in series (with automatic closure of open valves).~~

~~Quality Group A pressure retaining components and their supports are designed to meet the requirements for Class 1 components in ASME Section III, Division I, Subsection NB and NF.~~

Quality Group B

water- and steam-containing

Quality Group B applies to ~~pressure retaining~~ components ~~and their supports~~ that support the systems or portions of systems listed in the regulatory position C.1 of RG 1.26.

These systems or portions of systems are as follows:

a. Portions of the RCPB that are excluded from Quality Group A

b. Systems or portions of systems important to safety that are designed for the (i) emergency core cooling, (ii) post-accident containment heat removal, or (iii) post-accident fission product removal

c. Systems or portions of systems important to safety that are designed for (i) reactor shutdown or (ii) residual heat removal

d. Portions of the steam and feedwater systems of pressurized-water reactors extending from and including the secondary side of steam generators up to and including the outermost containment isolation valves, and connected piping up to and including the first valve (including a safety or relief valve) that is either normally closed or capable of automatic closure during all modes of normal reactor operation

e. Systems or portions of systems that are connected to the reactor coolant pressure boundary and are not capable of being isolated from the boundary during all modes of normal reactor operation by two valves, each of which is either normally closed or capable of automatic closure

Quality Group B ~~pressure retaining~~ components ~~and their supports~~ are designed to meet the requirements for Class 2 components in ASME Section III, Division I, Subsection NC, ~~NF~~ and NG.

water- and steam-containing

Quality Group C

Quality Group C applies to ~~pressure retaining~~ components ~~and their supports~~ that are not part of the reactor coolant pressure boundary or included in Quality Group B but part of the following:

water-, steam-, and radioactive-waste-containing

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a. Cooling water and auxiliary feedwater systems or portions of those systems important to safety that are designed for emergency core cooling, post-accident containment heat removal, post-accident containment atmosphere cleanup, or residual heat removal from the reactor and from the spent fuel storage pool

b. Cooling water and seal water systems or portions of those systems~~s~~ important to safety that are designed for the functioning of components and systems important to safety

c. Systems or portions of systems that are connected to the reactor coolant pressure boundary and are capable of being isolated from that boundary during all modes of normal reactor operation by two valves, each of which is either normally closed or capable of automatic closure

d. Systems, other than radioactive waste management systems, not covered by the above item a. through item c. that contain or may contain radioactive material and whose postulated failure would result in conservatively calculated potential offsite doses that exceed 0.5 rem to the whole body or its equivalent to any part of the body

Add

Quality Group C pressure retaining components ~~and their supports~~ are designed to meet the requirements for Class 3 components in ASME Section III, Division I, Subsection ND ~~and NF~~.

; only single component failures need be assumed for those systems located in Seismic Category I structures, and no credit should be taken for automatic isolation from other components in the system or for treatment of released material, unless the isolation or treatment capability is designed to the appropriate seismic and quality group standards and can withstand loss of offsite power and a single failure of an active component.