
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.: 228-8193
SRP Section: 11.02 – Liquid Waste Management System
Application Section: 11.2
Date of RAI Issue: 09/28/2015

Question No. 11.02-5

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 be designed to withstand the effects of natural phenomena. 10 CFR 50 Appendix A GDC 60 and Regulatory Guide 1.143 as it relates to the control of release of radioactive materials and the radwaste system safety classifications.

Staff review of DCD section 11.2.2 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 11.2.2.3 that states:

“The safety classification for the LWMS 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 – (Rev. 1)

Section 11.2.2.3 will be revised to address the system component boundary for each radwaste safety classification.

For consistency, [Section 11.3.2.1](#), which is a part of GWMS, will also be revised to include the system component boundary for each radwaste safety classification.

Impact on DCD

DCD Tier 2 Section 11.2.2.3 [and 11.3.2.1](#) 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.

APR1400 DCD TIER 2

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

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Component design data of the LWMS are listed in Table 11.2-6. The component design data include equipment flow rates and capacity, construction materials, and design temperatures and pressures. The codes and standards that are applicable to the LWMS components are listed in Table 11.2-7 and are consistent with codes and standards in NRC RG 1.143, Table 1 (Reference 1).

11.2.2.3.1 Tanks

The equipment waste tanks are the vertical, cylindrical type. Two tanks are provided in the LWMS to receive equipment drainage that is radioactively contaminated but contains a low level of suspended solids. The equipment waste tanks are used as backup tanks for the floor drain tanks whenever needed.

The floor drain tanks are the vertical, cylindrical type. Two tanks are provided in the LWMS to receive floor drainage from the reactor containment building, auxiliary building, compound building, and turbine building, which are expected to contain low levels of undissolved solids and oily contaminants.

The chemical waste tank is the vertical, cylindrical type. Two tanks are provided in the LWMS to receive influent from a common inlet header. Normally, one tank is filled while the other is on standby. Tanks are also equipped with cross-connect and overflow piping. The chemical waste tank also collects borated waste from the boric acid concentrator in the chemical and volume control system.

The detergent waste tank is the vertical, cylindrical type. Two detergent waste tanks are provided in the detergent waste subsystem. When one of the two detergent waste tanks is filled, the operator directs the influent to the other empty tank. The tank is sized to accommodate the expected daily peak volume of wastes.

The monitor tank is the vertical, cylindrical type. Two monitor tanks are provided in the LWMS. The monitor tanks are the only tanks in the LWMS from which the processed waste can be released to the environment or returned to the plant for reuse.

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The component boundaries for each radwaste safety classification are applied as follows:

- a. All components connected to a component classified as RW-IIa (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.
- b. All components connected to a component classified as RW-IIb (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.
- c. All components connected to a component classified as RW-IIc (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.

APR1400 DCD TIER 2

the rupture disc for the GRS header drain tank vent to limit the leakage of radioactive gases. The loop seal is provided with a connection for demineralized water to allow filling of the loop seal to prevent continuous venting of radioactive gas.

The system is designed to alarm locally and in the MCR for operator action.

One of the two gas analyzers takes continuous samples from various process points and from input sources to the system (e.g., gas stripper, volume control tank, reactor drain tank). The gas analyzer is set at a high alarm of 2 percent and high-high alarm at 4 percent oxygen concentrations. The alarm at the high setpoint (2 percent) provides the operating personnel with sufficient time for mitigation actions to lower the concentration of hydrogen and oxygen. Mitigation actions include investigation and eliminating or isolating the source of oxygen infiltration to the system or adding nitrogen gas as needed to stabilize and reduce oxygen concentrations within the system to less than the alarm level (2 percent). At the high-high setpoint, nitrogen is automatically injected to lower the oxygen concentration to below the 2 percent “high” setpoint. The APR1400 also includes design features such as chemistry control to minimize hydrolysis, which produces oxygen, and welded fabrication, which reduces or eliminates sources of oxygen leakage. The GRS is designed with the capability to isolate system and component inputs and the capability to use nitrogen purges to prevent the buildup of explosive mixtures.

11.3.2.1 Component Description

The radioactive safety classifications of the GRS components are determined in accordance with the guidance provided in RG 1.143 (Reference 2). The component safety classification is summarized in Tables 11.3-4. Accordingly, the GRS is classified as RW-IIa, based on the highest safety classification for the components within the system boundary. The GRS components are housed within the compound building, which has been determined to be RW-IIa.

~~The safety classification for the GRS component applies to the components, up to and including the nearest isolation valves, fittings, and/or welded/flanged nozzle connections.~~
The piping classification is determined based on the inventory and the composition of the gas for the corresponding segments of piping.

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The component boundaries for each radwaste safety classification are applied as follows:

- a. All components connected to a component classified as RW-IIa (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.
- b. All components connected to a component classified as RW-IIb (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.
- c. All components connected to a component classified as RW-IIc (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.