

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.: 371-8456
Review Section: 07.07 – Control Systems
Application Section: 07.07
Date of RAI Issue: 01/19/2016

Question No. 07.07-9

10 CFR 50 Appendix A, General Design Criterion 10, "Reactor Design", requires that the reactor be designed with sufficient margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. NUREG-0800 SRP Section 7.7, section III.1, states, in part, that the effects of failures of control systems should not cause plant conditions more severe than those described in the analysis of design basis accidents and anticipated operational occurrences in Chapter 15 of the safety analysis report.

Section 5.2.4.6, "Pressurizer Level Control (PLCS)," of APR1400-Z-J-NR-14012-P, Revision 0, "Control System CCF [Common Cause Failure] Analysis," states that postulated failures of the pressurizer level control group could cause a decrease in charging flow and increase in letdown flow, resulting in a decrease in reactor coolant system inventory. The evaluation presented in the report concludes that the postulated event is bounded by the DCD Section 15.6.2 Letdown Line Break analysis. However, the maximum letdown flow rate in lbm/sec cited in Table 5.2-7, "Multiple Failures of Single Control group (PLCS)," for the DCD Section 15.6.2 analysis is greater than the flow rate of 25 lbm/sec flow rate actually stated DCD Section 15.6.2.2. In addition, Section 5.2.4.6 of the report indicates that the charging valves (CV212 valves) are closed, whereas the DCD Section 15.6.2 Letdown Line Break analysis assumes the minimum charging flow of 70.4 gpm during the transient.

Reconcile the differences in charging and letdown flows described above and provide sufficient information in order to demonstrate that the postulated Pressurizer Level Control System Control Group failure described in Section 5.2.4.6 is bounded by the DCD Section 15.6.2 Letdown Line Break analysis, or provide an explicit analysis of the postulated failures of the pressurizer level control group event to demonstrate that the DNBR does not violate the specified acceptable fuel design limit (SAFDL).

Response1. Letdown Flow Rate

The letdown break flow rate described in Table 5.2-7 of technical report APR1400-Z-J-NR-14012, "Control System CCF Analysis," will be revised as follows:

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2. Charging Flow Rate

The charging flow rate assumed in Subsection 5.2.4.6 of technical report APR1400-Z-J-NR-14012 is the same as that of the DCD Tier 2, Section 15.6.2 analysis.

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3. Minimum DNBR

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In terms of fuel integrity, the factors that cause a decrease in a local departure nucleate boiling ratio (DNBR) are:

- a. Increasing coolant temperature
- b. Decreasing coolant pressure
- c. Increasing local heat flux
- d. Decreasing coolant flow



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Table 1 Initial Conditions for the Comparison Analysis



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Figure 1 RCS Pressure vs. Time

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Figure 2 PZR Water Volume vs. Time

Impact on DCD

There is no impact on the DCD.

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

Section 5.2.4.6 and Table 5.2-7 of technical report APR1400-Z-J-NR-14012 will be revised, as indicated in the attachment associated with this response.

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Table 5.2-7 Multiple Failures of Single Control group (PLCS)

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