

## 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 System  
Application Section: 07.07  
Date of RAI Issue: 01/19/2016

#### **Question No. 07.07-11**

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 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 5.2.4.8, "Control Rod Control (RRS/RPCS)," of APR1400-Z-J-NR-14012-P Revision 0 states that failure of the reactor regulating system/reactor power cutback system(RRS/RPCS) at low power causes an increase in feedwater flow combined with control element assembly (CEA) withdrawal. Because the postulated event results in multiple reactivity insertions, it is unclear whether the event is bounded by the DCD Section 15.4.1, "Uncontrolled CEA Withdrawal Event...", which involves only one reactivity insertion mechanism.

In order to confirm that that the Specified Acceptable Fuel Design Limit (DNBR) is not violated, it is therefore requested that the applicant provide either an explicit analysis of the postulated failure of the RRS/RPCS event or further technical justification to demonstrate that the event is bounded by the DCD Section 15.4.1 Uncontrolled CEA Withdrawal Event.

#### **Response**

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**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**

The Section 5.2.4.8 and Table 5.2-9 of APR1400-Z-J-NR-14012, Control System CCF Analysis, will be revised as indicated on the attached markup.



Table 5.2-9 Multiple Failures of Single Control group (RRS/RPCS) (Sh. 2 of 2)

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### **Question No. 07.07-12**

10 CFR 50 Appendix A, General Design Criterion 15, "Reactor Coolant System Design", requires that the reactor coolant system be designed with sufficient margin to assure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. NUREG-0800 SRP Section 7.7 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 5.2.4.8 of APR1400-Z-J-NR-14012-P, Revision 0, describes a postulated CEA withdrawal at full power conditions accompanied by turbine runback and setback demand resulting in a rapid increase in reactor coolant system pressure and immediate reactor trip, terminating the pressure transient below the AOO acceptance criteria (110% of design pressure). The DCD Section 15.4.2 analysis of the CEA Withdrawal at Power event indicates the peak reactor coolant system pressure is approximately 106% of design.

In order to confirm that the maximum reactor coolant system pressure does not exceed the acceptance criterion of 110% of the design value, it is requested that either an explicit analysis of the postulated failure of the RRS/RPCS event be provided, or further technical justification be provided to demonstrate that the peak reactor coolant system pressure remains within 110% of design.

### **Response**

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**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**

There is no impact on any Technical, Topical and Environment Report.