RESPONSE TO AUDIT ISSUES

APR1400 Topical Reports

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. PROJ0782

Review Section	**TR Realistic Evaluation Methodology for LBLOCA of the APR1400**
Application Section	**Topical Report: APR1400-F-A-TR-12004 Realistic Evaluation Methodology for Large-Break LOCA of the APR1400**
Issue Date	**08/13/2015**

Audit Issues No. 54

The guidance in RG 1.157, Section 4.3.1 establishes acceptable controls for the utilization of conservative parameters in best estimate analysis. [

]^{TS} Explain how this will be applied for operational cycles to ensure adequate conservatism.

Response

The variation of peaking factors at the limiting burn-up (BOC) of initial core is as follows;

- [ ]TS
- [ ]TS

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]TS

The maximum of peaking factors at the equilibrium cycles is as follows;

- [ ]TS
- [ ]TS

[
]TS

Radial peaking factor uncertainty of hot pin is assumed as 4 %, which is the value used in nuclear design. Radial peaking factor uncertainty of hot assembly is introduced to cover the cycle-wise variation, and it is calculated as 12 %.

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 Report

Topical report will be revised to modify typo described in this response.

There is no impact on Technical and Environmental Report.

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Hot Assembly Power

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Hot Pin Power Peaking Factor

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The technical specifications of the SKN 3 and 4 prescribe the LHGR limit as one of the limiting conditions for operation. The LHGR limit is defined as the product of Fq and the core average LHGR. The average LHGR at rated power is 5.602 kW/ft. The Fq corresponding to the LHGR limit 13.6 kW/ft is 2.428 (i.e., 13.6 kW/ft divided by 5.602 kW/ft). Therefore the range of Fq is extended to the limit of the technical specification of 2.428. The distribution function of Fq is conservatively assumed to be uniform.

- Parameter; hot pin power peaking factor (Fq)

  Distribution function; uniform

  Mean value; 2.184

  Minimum value; 1.940

  Maximum value; 2.428

5.1.2 Reactivity Feedback Related Parameters

Void Reactivity

The negative reactivity of the moderator rapidly reduces reactor power during the transient. Because the RELAP5/MOD3.3/K models the moderator density reactivity which corresponds to the void reactivity, it is necessary to treat the uncertainty of the moderator density reactivity. The moderator density reactivity is dependent on the moderator temperature coefficients (MTC); MTC involves various core parameters. This means that there is no one code parameter that characterizes the moderator density reactivity. Therefore, the uncertainty of the moderator density reactivity is treated conservatively. The core design provides two conservative moderator density reactivity curves for the LOCA analysis as shown in Figure 4-4. [