
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. 28

The guidance in RG 1.157, Section 4 establishes acceptable controls for the estimation of calculational uncertainty. Section 4.2.2.1.1 of the topical report states that the uncertainty of fuel thermal conductivity is based on the information from MATPRO (Version 11, Rev. 1, 1980). However, Section 2.3 of NUREG/CR-7024 provides the latest comparison of fuel thermal conductivity models against available experimental data. Section 2.3.2 of NUREG/CR-7024 provides a higher uncertainty for the MATPRO fuel thermal conductivity correlation for both un-irradiated and irradiated fuel as compared to that in Section 4.2.2.1.1 of the topical report. Section 2.3.2 of NUREG/CR-7024 states that the MATPRO fuel thermal conductivity correlation has a bias in the prediction of data from un-irradiated and irradiated uranium oxide fuel. Address the discrepancy between the uncertainty cited in the topical report and the assessment in NUREG/CR-7024, and justify the value used in the topical report.

Response

MATPRO [1] which was referred from CSAU presented standard error for UO₂ as ± 0.20 W/(m²·K). [

]TS Therefore, it is believed to have the conservative results when the MATPRO data is applied.

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]TS

References

- [1] NUREG-CR-0497, "MATPRO-Version 11 (Revision 1), A Handbook of Material Properties for Use in the Analysis of Light Water Reactor Fuel Rod Behavior," Feb. 1980.
- [2] NUREG-CR-0497, "MATPRO-Version 11 (Revision 2), A Handbook of Material Properties for Use in the Analysis of Light Water Reactor Fuel Rod Behavior," 1981.
- [3] NUREG-CR-7024, "Material Property Correlations: Comparisons between FRAPCON-3.4, FRAPTRAN 1.4, and MATPRO," Mar. 2011.
- [4] PNNL-19418, "FRAPCON-4.0: A Computer Code for the Calculation of Steady-State, Thermal-Mechanical Behavior of Oxide Fuel Rods for High Burnup," U.S.NRC, September 2015.

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 modified to consider TCD effects. Additional technical report will be submitted for TCD consideration.

There is no impact on Environmental Report.