
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

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

Docket No. 52-046

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SRP Section: 06.02.02 - Containment Heat Removal Systems
Application Section:
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Question No. 06.02.02-33

In Regulatory Guide 1.82, Rev. 4, "Water Sources for Long-Term Recirculation Cooling Following a Loss-of-Coolant Accident," position C 1.3.5 identifies the need to consider generation and characterization of debris from protective coatings. The calculated quantity of coating debris generated by a postulated design-basis accident (DBA) depends, in part, on the coating area, thickness, and density used in the calculations. The staff needs the following information to evaluate the calculated quantity of coating debris for the APR1400 in FSAR Section 6.8 and the corresponding technical reports:

- a. Appendix B of Technical Report APR1400-E-N-NR-14001-P, Rev. 0, describes the zone of influence (ZOI) applied to coating debris and summarizes the thicknesses for the coating systems in containment (Table B.3-1). Because various coating types are used in containment, and specifications may vary from product to product, provide the basis for the thickness values listed in Table B.3-1. In addition, explain and justify the differences between the coating thickness values in Table B.3-1 and the values in FSAR Table 6.2.1-23).
- b. Provide the basis for the density values for epoxy and inorganic zinc coatings listed in Table 3.3-2 of APR1400-E-N-NR-14001-P, Rev. 0. Describe how these density values result in conservative values for the calculated quantity of coating debris.
- c. If appropriate, describe your plans to revise the FSAR and/or Technical Report to ensure the coatings debris evaluation is conservative.

Response

- a. The coating thickness values listed in Table B.3-1 come from the dry film thickness (DFT) requirements of the project coating specifications of the reference plants. The DBA qualified coating materials with the coating thickness values are used as the Service Level I coatings inside containment and the coating thickness values (ranges)

are strictly managed in accordance with the quality assurance requirement for the Service Level I coating works.

DCD, Table 6.2.1-23 provides the heat structures data within the containment for the passive heat sink model used in the containment pressure and temperature analysis and the ECCS performance analysis. Thickness of each structure provided in Table 6.2.1-23 is a conservative value estimated for each analysis, which is within the ranges provided in the Table B.3-1 of Technical Report APR1400-E-N-NR-14001-P/NP.

For example, for the zinc primer and epoxy coatings of the containment liner plate, the thickness of 4 mils (0.004 in) that is the average value of the ranges of 3 mils to 5 mils provided in Table B.3-1 is chosen for the containment maximum pressure and temperature calculation as shown in Part A of Table 6.2.1-23.

- b. The density values of epoxy and inorganic zinc coatings listed in Table 3.3-2 of Technical Report were assumed from Table 3-3 of NEI 04-07. Using the coating debris characteristics in Table 3-3 of NEI 04-07 is considered to be reliable and conservative.
- c. Table 3.3-2 of the Technical Report will be revised to add the reference for density values for epoxy and inorganic zinc coatings.

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

Technical Report, APR1400-E-N-NR-14001-P/NP, Table 3.3-2 will be revised, as shown in Attachment.

Table 3.3-2 Debris Properties

Debris Source Type	Property	Value
RMI	Density	7.85 g/cm ³ (490 lbm/ft ³)
Coating	Diameter of particle (D _p)	10 μm (3.94x10 ⁻⁴ inch)
	Particle density (μ _p) - epoxy - IOZ	1.51 g/cm ³ (94 lbm/ft ³) 7.32 g/cm ³ (457 lbm/ft ³)
Latent Particulate	Particle density (μ _p)	2.70 g/cm ³ (168.6 lbm/ft ³)
Latent Fiber (NUKON)	As-fabricated (theoretical Packing) density (c _o)	0.038 g/cm ³ (2.4 lbm/ft ³)
	Fiber density (μ _f)	1.50 g/cm ³ (93.6 lbm/ft ³)

Note:
(1) Referenced from Table 3-3 of NEI 04-07