

REQUEST FOR ADDITIONAL INFORMATION 313-2361 REVISION 1

4/2/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 15.04.08 - Spectrum of Rod Ejection Accidents (PWR)

Application Section: 15.4.8

QUESTIONS for Reactor System, Nuclear Performance and Code Review (SRSB)

15.04.08-1

Question 15.4.8-1

In the rod ejection accident (REA) analysis the neglect of the high power range neutron flux rate trip is conservative. Discuss how much of a difference this assumption makes in the calculated peak fuel enthalpy?

15.04.08-2

Question 15.4.8-2

Values of ejected rod worth and hot channel factors used in the REA analysis are stated to be conservative. What are realistic values for these quantities for the events from zero and full power for both beginning- and end-of-cycle?

15.04.08-3

Question 15.4.8-3

It is stated that the moderator reactivity is conservatively estimated by multiplying the moderator slowing down density by a conservative multiplier. Since the moderator temperature coefficient may be positive or negative depending on power level and time in cycle, is a single multiplier used? What is the multiplier and how does that relate to the statement in Table 15.0-1 that the MTC is *reduced* by 20%?

15.04.08-4

Question 15.4.8-4

The void fraction is adjusted in the analysis of pressure during the REA. State what conservative multiplier is used?

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15.04.08-5

Question 15.4.8-5

Per Regulatory Guide 1.77, perform rod ejection analyses for both Beginning of Cycle and End of Cycle starting from a low-power condition and provide analysis results.

15.04.08-6

Question 15.4.8-6

Provide drawings of the missile shield which dissipates the ejected CRDM's kinetic energy. Also, provide analysis to demonstrate that the CRDM's resulting kinetic energy upon deflection is sufficiently low so as to not cause the failure of a neighboring housing.

15.04.08-7

Question 15.4.8-7

In accordance with SRP Section 15.4.8 guidance found in Part III, "Review Procedures," include consideration of PCMI failure during the rod ejection analysis for at-power conditions.

15.04.08-8

Question 15.4.8-8

Provide the specific "realistic" gap conductance models employed for the DNB and RCS pressure analysis along with the justification for their applicability.

15.04.08-9

Question 15.4.8-9

Provide the specific number of fuel rods predicted to be in DNB for Beginning of Cycle and End of Cycle for HFP cases.

15.04.08-10

Question 15.4.8-10

Provide the definition and justification of the conservative multiplier applied to the void fraction used in the peak RCS pressure analysis.