

# REQUEST FOR ADDITIONAL INFORMATION 310-2346 REVISION 2

5/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 15.04.03 - Control Rod Misoperation (System Malfunction or Operator Error)  
Application Section: 15.4.3

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

15.04.03-1

**Question 15.4.3-1**

In Section 15.4 it states, "The uncontrolled withdrawal of a single RCCA and the spectrum of rod ejection are classified as postulated accidents (PAs)." Provide explicit details and a probabilistic analysis justifying the reclassification of RCCA withdrawal. Specifically, the staff requests the applicant to provide risk assessment studies and radiological consequences for RCCA withdrawal.

15.04.03-2

**Question 15.4.3-2**

Provide a list of the various combinations of dropped RCCA locations and rod worths that are used to identify the limiting hot channel factor for that event.

15.04.03-3

**Question 15.4.3-3**

Discuss how does the assumed dropped rod worth of 0.25% compare with the actual maximum dropped rod worth?

15.04.03-4

**Question 15.4.3-4**

Discuss how does the assumed hot channel factor of 1.90 compare to the maximum value expected during a dropped rod event?

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15.04.03-5

### **Question 15.4.3-5**

Calculations were carried out to determine the limiting configuration with one or more misaligned RCCAs. What configurations were sampled? It is assumed that the limiting misalignment is with one RCCA completely withdrawn. What is the effect of two RCCAs, or a control rod group, withdrawn?

15.04.03-6

### **Question 15.4.3-6**

It is stated that the minimum DNBR calculated for the misaligned RCCA satisfies the acceptance criterion. What is the calculated value for the minimum DNBR?

15.04.03-7

### **Question 15.4.3-7**

What are the configurations sampled to determine the limiting condition for the uncontrolled withdrawal of an RCCA? (See also Question 15.4.3-5)

15.04.03-8

### **Question 15.4.3-8**

For the withdrawal of a single RCCA, it is understood that the minimum DNBR at the hot spot will not satisfy the 95/95 limits. Discuss how the number of rods below the DNBR limit is obtained?

15.04.03-9

### **Question 15.4.3-9**

What is the fuel centerline temperature for the withdrawal of a single RCCA?

15.04.03-10

### **Question 15.4.3-10**

Specify which steady-state core design codes were used throughout the analysis and include references to the codes. Be specific with code versions and provide reference.

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15.04.03-11

**Question 15.4.3-11**

Demonstrate that the limiting RCCA misalignment is one RCCA fully withdrawn with the remaining RCCAs in the bank at their insertion limits.