

REQUEST FOR ADDITIONAL INFORMATION 308-2340 REVISION 2

5/4/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 15.04.01 - Uncontrolled Control Rod Assembly Withdrawal from a Subcritical or Low Power Startup Condition
Application Section: 15.4.1

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

15.04.01-1

Question 15.4.1-1

TWINKLE-M is used to analyze the uncontrolled RCCA withdrawal event from zero power using a one-dimensional model. It is claimed that with the assumptions used, the methodology will lead to a conservative result. Show comparisons with the results of a three-dimensional model to justify that this approach is conservative.

15.04.01-2

Question 15.4.1-2

Explain what is meant by the statement “appropriate cross section data is selected to assure minimum Doppler feedback conditions” made in Section 15.4.1.3.2.

15.04.01-3

Question 15.4.1-3

In DCD Section 15.4.1.3.2, explain why assuming “the effective multiplication factor to be one” maximizes the neutron flux peak?

15.04.01-4

Question 15.4.1-4

How does the “conservative” withdrawal rate of 75 pcm/s for the uncontrolled RCCA bank withdrawal compare with the rate expected for both zero and full power initial conditions?

REQUEST FOR ADDITIONAL INFORMATION 308-2340 REVISION 2

15.04.01-5

Question 15.4.1-5

Are the most limiting axial and radial power shapes used for the bank withdrawal analysis calculated with ANC or TWINKLE-M? What is the control rod configuration that gives the most limiting shape?

15.04.01-6

Question 15.4.1-6

The discussion of bank withdrawal from zero power event does not consider LOOP and neither does the dropped RCCA event, presumably because there is no reactor trip. How do these events take into account LOOP?

15.04.01-7

Question 15.4.1-7

In Section 15.4.1.5 and 15.4.2.5, it is stated that the radiological consequences for these AOOs are bounded by those calculated for a PA. It is understood that there are no radiological consequences for these events and this should be stated.

15.04.01-8

Question 15.4.1-8

Verify that the positive reactivity insertion rate of 75 pcm/s used in the one-dimensional core simulation bounds the simultaneous withdrawal of 2 sequential RCCA banks of maximum worth at maximum speed in the three-dimensional case.

15.04.01-9

Question 15.4.1-9

Plot and submit the peak fuel rod power as a function of time for the Section 15.4.1 analysis.