

REQUEST FOR ADDITIONAL INFORMATION 881-6203 REVISION 3

12/21/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 06.03 - Emergency Core Cooling System
Application Section: 6.3

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects)
(CIB1)

06.03-104

The US-APWR safety injection (SI) pumps will be required to mitigate the entire range of small and large break loss of coolant accidents (LOCAs). The US-APWR Design Control Document (DCD) states that the design flow of each pump is 1540 gallons per minute (gpm) and the minimum flow is 265 gpm through the pump minimum-flow loop. When running at low flow conditions the SI pumps may encounter recirculation cavitation. By RAI question 06.03-103 dated November 14, 2011, the staff requested MHI to specify in the US-APWR DCD that SI pump functional qualification will be accomplished in accordance with ASME Standard QME-1-2007, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants," as accepted in Revision 3 to Regulatory Guide 1.100, "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants," to demonstrate the design-basis capability of the pumps for their required mission times under recirculation cavitation conditions. To provide verification that pump design will preclude cavitation when operated during low flow conditions, staff is requesting MHI to add a new ITAAC in Tier 1, Section 2.4.4, "Emergency Core Cooling System," with suggested wording as follows:

Design Commitment: Safety injection pump design will preclude cavitation when operated during low flow design-basis conditions for the required mission time.

Inspection, Test, Analyses: Pre-operational tests will be performed to confirm that cavitation will not occur in safety injection pumps when operated during low flow design-basis conditions for the required mission time.

Acceptance Criteria: A report exists and concludes that pre-operational tests confirm that cavitation will not occur in safety injection pumps when operated during low flow design-basis conditions for the required mission time.