

# REQUEST FOR ADDITIONAL INFORMATION 217-2025 REVISION 1

2/26/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.06.03 - Leak-Before-Break Evaluation Procedures  
Application Section: 3.6.3

QUESTIONS for Balance of Plant Branch 2 (ESBWR/ABWR) (SBPB)

03.06.03-15

DCD Tier 2 Section 3.6.3.1, "Application of LBB," indicates that the application of LBB includes RCL piping, RCL branch piping, and main steam piping in PCCV. DCD Section 3.6.3.4.1, "Leak Detection Capability," describes the leak detection methods for supporting LBB. In US APWR DCD, the leak detection capability to support LBB is one gpm within one hour regardless of different piping being used for LBB. DCD Section 3.6.3.4.1 states that leak rate of 10 times the capability of the leak detector is postulated for normal operating load combination. This margin of 10 leak detector capability for LBB is in accordance with SRP Section 3.6.3. AP 1000 and US EPR have demonstrated that the 1 gpm criterion may not be adequate to satisfy the LBB margin of 10. Depending on the piping (large size RCP piping, small size RCL piping, or main steam piping) being postulated for LBB application, the required leak detection capability can be 1 gpm, 0.5 gpm, or 0.1 gpm. The applicant is requested to demonstrate that the design of leak detector capability (one gpm within one hour) is adequate to support the margin of 10 for LBB application in RCL branch piping and for main steam piping.

03.06.03-16

DCD Tier 2 Section 3.6.3.1, "Application of LBB," indicates that the application of LBB includes RCL piping, RCL branch piping, and main steam piping in PCCV. DCD Section 3.6.3.4.1, "Leak Detection Capability," describes the leak detection methods used for the reactor coolant are the containment sump water levels, inventory balance, and the radiation in the environment of containment. DCD Section 3.6.3.4.1 states that the method to detect leaks from the main steam pipe in containment is the containment sump water level. The condensate water flow rate of containment air cooler, containment pressure, and temperatures provide qualitative information for the possibility of leakage.

The staff reviewed the above information and found that the leak detection methods identified for the RCL piping such as inventory balance, and the radiation in the environment of containment are not applicable for the main steam piping. For main steam leak, there is only one quantitative leak detection method, containment sump level, to support main steam LBB. The staff was not able to confirm the seismic

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qualification of the containment sump level detector in DCD Table 3.2-2, "Classification of Mechanical and Fluid Systems, Components, and Equipment." It is not listed in Table 3.2-2. DCD Section 3.6.3.2, "Design Criteria for LBB," states that leak detection systems meet the requirements of RG 1.45 (Revision 0). The applicant is requested to demonstrate how the methods for the main steam leakage detection meet RG 1.45 or its equivalent in terms of instrument capability, sensitivity, diversity (and/or redundancy), response time, seismic qualification, and Technical Specification operability requirements.