
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

3/29/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 905-6311 REVISION 3

SRP SECTION: 03.08.03 – Concrete and Steel Internal Structures of Steel or Concrete Containments

APPLICATION SECTION: 3.8.3

DATE OF RAI ISSUE: 01/25/2012

QUESTION NO. 03.08.03-69:

MHI Technical Report (TR) MUAP-11019-P (R0) indicates that splitting or delamination failure of the composite section through the concrete infill is another potential SC specific failure mode. The Design Philosophy and Executive Summary of the TR, page viii, states that "... steel tie bars provide structural integrity to the SC section and prevent SC specific delamination or splitting failure mode from occurring The area and spacing of the tie bars are designed to meet the minimum shear reinforcement requirements." The staff notes that there is no specific design criterion discussed in this report which demonstrates that these tie bar sizes and spacing will prevent delamination or a splitting failure mode; therefore, explain how the delamination or splitting failure mode can be prevented by providing adequate out-of-plane shear strength. Also, identify what tests exist which provide additional justification to show that delamination or splitting would not occur anywhere for the configuration that is the same or similar to the US-APWR configuration.

ANSWER:

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-12108 (ML12138A217).

Section 2.7 of Technical Report MUAP-11019, Rev. 1, has been updated to include discussion of delamination and splitting failures. This section demonstrates that the tie bars in the typical steel concrete (SC) walls have more than sufficient capacity to prevent splitting or delamination failure modes.

MUAP-11013, Rev. 2, Appendix B, summarizes the confirmatory physical testing that was performed based on the configuration of the US-APWR SC walls. No test exhibited splitting or delamination behavior.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

Impact on Technical/Topical Report

There is no impact on the Technical/Topical Report.

This completes MHI's response to the NRC's question.