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**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

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**03/29/2013**

**US-APWR Design Certification**

**Mitsubishi Heavy Industries**

**Docket No. 52-021**

**RAI NO.:** NO. 497-3734 REVISION 0  
**SRP SECTION:** 03.08.04 - Other Seismic Category I Structures  
**APPLICATION SECTION:** 3.8.4  
**DATE OF RAI ISSUE:** 12/01/2009

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**QUESTION NO. 03.08.04-42:**

In its response to Parts (a) and (b) of Question 3.8.4-20, MHI presents the equations used to calculate the reduction factor of flexural stiffness for the cracked concrete section to the uncracked section of a 48 in. thick steel concrete (SC) module wall. MHI states that by using the same methodology, the stiffness reduction factors for the 39 in. and 56 in thick walls are calculated, and all of the results are shown in a table in the response. References are cited to justify the values of the reduction factor,  $\alpha$ , as stated. These references are in Japanese technical journals.

In examining the data presented in Table 1 of MHI's response to this question, the staff notices that the data for the reduction factors of axial stiffness and shear stiffness are far below 0.5. This trend is also observed in Table 3 for the data for flexural stiffness. Therefore, using the factor of 0.5 overestimates the shear wall stiffness. The applicant is requested to provide the rationale that supports the use of 0.5 for the reduction factors of axial stiffness and shear stiffness when many values shown are far below 0.5.

Reference: MHI response to RAI 342-2000, dated 7/3/2009, MHI Ref: UAP-HF-09360, ML091900558.

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**ANSWER:**

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-10047 (ML100550204).

US-APWR Design Control Document (DCD) Rev. 3 has been revised to describe the separation of steel concrete (SC) walls into three categories and to provide an evaluation of two loading conditions representing cracked and uncracked concrete. DCD Table 3.8.3-4 provides a summary of stiffness and damping values for each combination.

Technical Report MUAP-10006, Rev.3 and Technical Report MUAP-11013, Rev.2 describes the methodology used for SC module design and validation. A linear stiffness,  $\alpha$ , of 0.5 is no longer applied to the SC wall. Technical Report MUAP-11018, Rev. 1 provides the revised stiffness criteria and justification for stiffness and damping values used in seismic analysis.

**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.

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