

# REQUEST FOR ADDITIONAL INFORMATION 791-5864 REVISION 3

7/26/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.07.02 - Seismic System Analysis

Application Section: 3.7.2

QUESTIONS for Structural Engineering Branch 1 (AP1000/EPR Projects) (SEB1)

03.07.02-85

## Clarification RAIs for MUAP-11001 (R0)

1. In Subsection 1.1 of MUAP-11001 (R0), "Description of the A/B," the 6<sup>th</sup> sentence states "Steel Girder beams are used to provide additional support to the part of the roof slab and the third floor slab." This sentence does not describe which part of the roof slab is supported by the steel girder beams, and what kind of support is used for the rest of the roof slab. The Applicant is requested to clarify this sentence.
2. In Subsection 2.4 of MUAP-11001 (R0), "Detailed FE Structural Model," the second paragraph (page 24) states, "The seismic design demands are obtained from a response spectrum analysis of the detailed FE model as described in Section 4.2 below. "The Section 4.2 is entitled "Results of Lumped Mass Stick Model SSI Analyses". The staff is not able to find any descriptions for the response spectrum analysis of the detailed FE model in Section 4.2 of the Report. The staff, however, finds the descriptions in Sections 5.2 and 5.3. The Applicant is requested to correct this apparent mistake.
3. In Subsection 3.3 of MUAP-11001 (R0), "Validation of Model Translation from ANSYS to SASSI," the paragraph (page 37) states, "Figure 3.3-1 and Figure 3.3-2 present the results of the validation SASSI analyses for acceleration transfer functions at selected locations. These figures show that the peak amplifications of the transfer functions occur at or close to the values of the dominant frequencies shown in Table 3.3-1 and Figure 3.2-1 and Figure 3.2-2, which indicates that the translation of the A/B dynamic FE model into SASSI format is accurate." The Applicant is requested to provide legends for the dots and solid curves shown in Figures 3.3-1 and 3.3-2 indicating which one represents the ANSYS results and which one represents the SASSI results. Also, there is no Table 3.3-1. It should be Table 3.2-1. The Applicant is requested to correct this mistake.
4. In Subsection 4.2.1 of MUAP-11001 (R0), "Maximum Forces and Moments," the first paragraph (page 42) states, "The combined maximum seismic response axial, NS and EW shear forces and the maximum torsional and bending moments about the NS and EW axes obtained from SRSS combinations of the maximum seismic responses generated from the three individual directions (horizontal NS and EW and vertical) of seismic input for all eight generic site

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profile cases considered are shown in Figures 4.2-1 through 4.2-6.” The labels for the vertical axis of Figures 4.2-1 through 4.2-6 are not legible. The Applicant is requested to make the labels legible. This request applies to all figures in Chapter 4.

5. In Subsection 5.1.2 of MUAP-11001 (R0), “Live Loads (L),” the second paragraph (page 58) states, “The roof is conservatively designed for uniform snow live load of 75 50 psf per Table 1 of the SDC (Reference 7.9).” It appears that ‘75 50 psf’ in the sentence is a typo. The Applicant is requested to clarify the meaning and correct any mistake.
6. In Subsection 5.1.5 of MUAP-11001 (R0), “SSE Loads ( $E_{ss}$ ),” the second paragraph (page 59) states, in part, “Dynamic soil pressures are taken from Table 4-12 of MHI TR MUAP-10006 (Reference 7.2).” The staff is aware that the Applicant is preparing extensive revisions to TR MUAP-10006, and therefore the dynamic soil pressures may be significantly affected by these changes. The Applicant is requested to describe how these changes will be factored into the seismic stability evaluation of the A/B.
7. In Section 6.0 of MUAP-11001 (R0), “Conclusion,” the second paragraph (page 79) states, “The detailed FE models used for static and RSA are described and validated as presented in Section 2.4.” In Section 2.4, the Applicant refers to Section 4.2 for the detailed FE model. The staff did not find the description and validation of the detailed FE model used for RSA in Section 4.2 (see question number 2 above). The staff, however, finds the FEM model description in Section 2.3 and the validations in Sections 3.1, 3.2 and 3.3. The Applicant is requested to correct this mistake.