
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

1/31/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	NO. 776-5851 REVISION 3
SRP SECTION:	03.07.02 – Seismic Systems Analysis
APPLICATION SECTION:	3.7.2
DATE OF RAI ISSUE:	06/15/11

QUESTION NO. RAI 03.07.02-75:

In Subsection 4.1 of MUAP-11001 (R0), "Methodology," the fourth paragraph (page 41) states, "Table 4.2-1 provides a summary of the dynamic models, site profiles, number of frequencies of analyses and cut-off frequency of analyses used for the different SSI analyses presented in this report. The horizontal size of the FE mesh of the basemat is also presented in the table together with the maximum frequency of the waves that can be transmitted through the soil-foundation interface based on the criterion that the basemat FE size is not more than 20% of the minimum wave length."

The ZPA for the CSDRS is 50 Hz. The staff noticed that for several soil profiles, the data for the maximum wave passage frequency presented in Table 4.2-1 are much less than 50 Hz. The SRP Acceptance Criteria 1.A (1) of SRP 3.7.2 states, "all modes with frequencies less than the ZPA (or PGA) frequency of the corresponding spectrum are adequately represented in the dynamic solution." Both the lumped mass stick model and the FE model used in the report do not meet this criterion for soft soil profiles. The Applicant is requested to revise their methodology or to provide the technical basis and justification to demonstrate that their approach is conservative.

ANSWER:

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-11281 (ML11243A163).

Technical Report MUAP-11001 has been superseded and the relevant information incorporated into Technical Report MUAP-10006, Rev. 3. The reactor building (R/B), prestressed concrete containment vessel (PCCV), containment internal structure, east and west power source buildings (PS/Bs), auxiliary building (A/B), and essential service water pipe chase are now structurally integrated and supported on a common basemat to form the R/B complex. Technical Report MUAP-10006, Rev. 3, presents the information relevant to the added A/B and PS/Bs as well as the other buildings that make up the R/B complex.

The lumped mass stick model is not considered for R/B complex soil-to-structure interaction analysis except for the reactor coolant loop, which is coupled with the R/B complex finite element model. Section 03.3.3.5 and Tables 03.3.4.1-1 through 03.3.4.1-3 of Technical Report MUAP-10006, Rev. 3 provide the wave passage frequencies for each of the six soil cases in both horizontal and the vertical directions. Section 03.3.5 of the same report discusses the cut off frequencies for each soil profile and provides justification for why the two soft soil profiles, 270-500 and 270-200, with the maximum passage frequency of 40 Hz is acceptable.

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 a Technical/Topical Report.

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