RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

1/31/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 856-6094 REVISION 3**
SRP SECTION:	**03.07.02 – Seismic System Analysis**
APPLICATION SECTION:	**3.7.2**
DATE OF RAI ISSUE:	**10/24/11**

QUESTION NO. RAI 03.07.02-173:

In Subsection 3.3.1 of MUAP-11011 (R0), "Effect on Ground Motion at Adjacent Building Foundation Locations," the second paragraph (Page 8) states, "The 5%- damped Amplified Response Spectra (ARS) results at these near-field ground surface interaction nodes, obtained from the site-independent SSI analyses of the eight generic layered soil profiles, are computed and compared with the 5%-damped ARS of the free-field input motion and the 5%-damped US-APWR Certified Seismic Design Response Spectra (CSDRS)."

The results of the above quoted sentence are presented in Figures 3.3.1-3 through 3.3.1-19. There are ten (10) curves mentioned in the above quoted sentence. However, there are only nine (9) curves shown in Figures 3.3.1-3 through 3.3.1-19. The missing one is the 5%-damped ARS of the free-field input motion. The applicant is requested to revise these figures to include the missing curve.

Also, as indicated in these comparisons cited above, the kinematic SSSI effects on the horizontal near-field ground surface site response motions are relatively small at the locations near the centers of the East and West PS/B, A/B, and T/B. However, the effects on the vertical near-field ground surface site response motions are more significant. The applicant is requested to explain why the vertical effects are significant, while the horizontal effects are not significant.

ANSWER:

Technical Report MUAP-11011, Rev. 0 has been superseded and the relevant information on the structure-soil-structure interaction (SSSI) analysis methodology has been incorporated into Technical Report MUAP-10006, Rev. 3.

The reactor building (R/B) complex now consists of the R/B, prestressed concrete containment vessel (PCCV), containment internal structure (CIS), east and west power source buildings (PS/Bs), auxiliary building (A/B), and essential service water pipe chase (ESWPC) supported on a common basemat. A SSSI analysis of the influence of the turbine building (T/B) on the R/B complex was performed as described in Subsections 03.3.3 and 03.3.4 of Technical Report MUAP-10006, Rev. 3. The SSSI analysis used finite element (FE) models of both the R/B complex and the T/B. The SSSI analysis produced some instances and locations where the in-

structure response spectra (ISRS) results were not enveloped by the soil-structure interaction (SSI) results. Consequently, the design basis for the US-APWR was changed to use the envelope of results including the SSSI results. Therefore, because SSSI analyses are performed as documented in Technical Report MUAP-10006, Rev. 3, the 10 curves mentioned above are no longer relevant.

The intention of the statement, “However, the effects on the vertical near-field ground surface site response motions are more significant,” was to note an observation that there was a significant vertical response at the near field centers of structures, which represents the amplification of the free field including any SSSI effects. The intention was not to suggest there is a dominant SSSI effect contributing to the vertical response at the near field centers of structures. The sentence is not present in Technical Report MUAP-10006, and presentation of justification that SSSI responses are insignificant is not necessary because SSSI analyses are performed.

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.