RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

1/31/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 850-6002 REVISION 3**
SRP SECTION:	**03.07.01 – Seismic Design Parameters**
APPLICATION SECTION:	**3.7.1**
DATE OF RAI ISSUE:	**10/21/11**

QUESTION NO. RAI 03.07.01-27:

The purpose of Section 5.2.1 of MUAP-10001(R3), "Site Response Analysis," for Standard plant structures is not clear to the staff. The Applicant is requested to explain its purpose and how the results presented have been used in conducting the SSI analyses for the CSDRS.

(i) The first paragraph on Page 5-16 states, "The site response analyses are conducted using the equivalent linear RVT approach (Reference 8, Reference 10, and NUREG/CR-6729 (Reference 17)) with the point-source model used to generate both the horizontal and vertical motions (References 8, 10, and 11)." The staff did not find the relevance of the equivalent linear RVT approach in the SSI analyses.

(ii) The last sentence of the 1st paragraph (Page 5-16), states: "Figure 5.2-3 also suggests a simple manner to update the CSDRS to reflect the expected spectral shape for CEUS strong ground motions." The Applicant is requested to explain the relevance of Figure 5.2-3 and how Figure 5.2-3 will is used in the SSI analysis and design of the standard plant SSCs.

The applicant is also requested to explain the different base rock definitions in the footnote to Table 5.2-1 on page 5-12 that defines the base rock differently for different soil profiles.

ANSWER:

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-11417 (ML11339A013).

Technical Report MUAP-10001, Rev. 3 has been superseded and its relevant information has been incorporated into Technical Report MUAP-10006, Rev. 3. The site response analyses previously described in Section 5.2.1 of Technical Report MUAP-10001, Rev. 3, are now discussed in Section 01.5.2.1 of Technical Report 10006, Rev. 3.

i) As stated in Section 01.5.2.1 of Technical Report MUAP-10006, Rev. 3, site response analyses using the equivalent linear random vibration theory approach (described in Section 01.4.2 of Technical Report MUAP-10006) are performed to develop the

certified seismic design response spectra (CSDRS) strain-compatible soil properties used as input for the soil-structure interaction analyses of the standard plant.

ii) The sentence "Figure 5.2-3 also suggests a simple manner to update the CSDRS to reflect the expected spectral shape for Central and Eastern United States strong ground motions" is not relevant and is not included in Technical Report MUAP-10006, Rev. 3. Information previously shown in Figure 5.2.3 of Technical Report MUAP-10001, Rev. 3, is now discussed and presented in Section 01.5.2.1 and Figure 01.5.2.1-1 in Technical Report MUAP-10006, Rev. 3. Figure 01.5.2.1-1 shows the median spectral shapes that represent the horizontal input motions used to determine CSDRS strain-compatible soil properties for each of the six generic site profiles. The spectral shapes in Figure 01.5.2.1-1 show that the horizontal input motions used to determine CSDRS strain-compatible soil properties do not exceed the CSDRS. As discussed in Section 01.4.2.2 of Technical Report MUAP-10006, Rev. 3, this ensures that the soil properties are realistic and that the soil column is not overdriven by the broad banded CSDRS.

The list of design-basis generic layered profiles previously presented in Table 5.2-1 in Technical Report MUAP-10001, Rev. 3, is now presented in Table 01.4.2.1-1 in Technical Report MUAP-10006, Rev. 3. As presented in Table 01.4.2.1-1 and discussed in Section 01.4.2.1 of Technical Report MUAP-10006, Rev. 3, for profiles 270-200 and 560-500 the baserock includes sedimentary or weathered rock overlying Precambrian basement material. For profile 560-500, the baserock includes 1000 ft deep strata of sedimentary or weathered rock resting on the rock basement. For the 270 and 560 profiles, the baserock has a shear wave velocity of 1 km/s corresponding to a soft baserock. For profiles 900-100, 900-200, and 2032-100, which include sites with residual soil (saprolite) over weathered rock, the baserock is a hard rock, which has a shear wave velocity of 2.83 km/s.

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 Report

There is no impact on a Technical Report.

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