

US-APWRRRAIsPEm Resource

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Sent: Wednesday, August 14, 2013 2:23 PM
To: 'us-apwr-rai@mhi.co.jp'; US-APWRRRAIsPEm Resource
Cc: Shams, Mohamed; Tegeler, Bret; Galvin, Dennis; Kallan, Paul; Ward, William
Subject: US-APWR Design Certification Application RAI 1047-7217 (3.7.1)
Attachments: US-APWR DC RAI 1047 SEB1 7217.pdf

MHI,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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REQUEST FOR ADDITIONAL INFORMATION 1047-7217

Issue Date: 08/14/2013

Application Title: US-APWR Design Certification - Docket Number 52-021

Operating Company: Mitsubishi Heavy Industries

Docket No. 52-021

Review Section: 03.07.01 - Seismic Design Parameters

Application Section: 3.7.1 [MUAP-10006(R3)]

QUESTIONS

03.07.01-44

The staff performed a review of DCD Section 3.7.1 pertaining to supporting media for Seismic Category I Structures, in accordance with the guidance provided in SRP Section 3.7.1. In DCD Section 3.7.1.3, the applicant provides a description of the site response analysis performed to develop the six (6) strain-compatible generic soil profiles used for seismic design/analysis of the US-APWR standard plant, subject to the certified seismic design response spectra (CSDRS). However, it is not clear to the staff whether a COL applicant is expected to implement the approach described in the DCD, or would implement existing regulatory guidance in RG. 1.208 and ISG-17, in performing the site response analysis for the site-specific soil-structure interaction (SSI).

Based on the above, the staff requests the applicant to clarify in DCD Section 3.7.1 the method the COL applicant will implement for developing the site-specific strain-compatible soil profiles, for use in the site-specific SSI analysis. If the proposed method in the DCD for use by COL applicant departs from applicable regulatory guidance, the departures should be clearly identified in the DCD and the departures should be technically justified.

03.07.01-45

In support of the evaluation of DCD Section 3.7.1, the staff reviewed relevant sections of MUAP-10006 (R3), Part 1. The staff noted that MUAP-10006, Section 01.4.2, p. 01.4-6, and Section 01.4.2.1, pg. 01.4-8, state that for the development of the strain-compatible profiles, for cases 270-200 and 270-500, the top 68 ft of soils are removed and replaced, so that the parameter V_{s30} is at least 425 m/s. The stated intent is to ensure that the lower-bound (minus one sigma) strain-compatible shear wave velocity near plant grade is at least 800 ft/s.

Staff experience in construction and placement of fill materials finds that soil replacement consistent with the above assumptions may be difficult to achieve in practice. Typical engineered granular backfills with strain levels consistent with the certified seismic design response spectra (CSDRS) motions would likely have near-surface strain-compatible shear wave velocities that are significantly lower than the assumed median values of 1296 ft/s (case 270-200, Table 01.5.2.2-1), 1178 ft/s (case 270-500, Table 01.5.2.2-2), and 1066 ft/s (case 560-500, Table 01.5.2.2-3) (e.g., Menq 2003).

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Therefore, the staff requests the applicant to address the following:

(a) Provide the technical basis for the above backfill assumptions, taking into consideration field measurements of near-surface shear wave velocities for typical engineered granular backfills.

(b) Clarify whether there is a COL Item to ensure this requirement (i.e., lower-bound strain-compatible shear wave velocity near plant grade of at least 800 ft/s) is met at a particular site. Explain how a COL applicant will demonstrate the applicability of the certified standard plant design if this requirement cannot be met.

Reference

Menq, F. Y. (2003), "Dynamic Properties of Sandy and Gravelly Soils." Ph.D. Dissertation. School of Civil Engineering, University of Texas at Austin.