
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

03/29/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 660-5134 REVISION 2
SRP SECTION: 03.07.02 – Seismic System Analysis
APPLICATION SECTION: 3.7.2
DATE OF RAI ISSUE: 11/15/2010

QUESTION NO. 03.07.02-35 (03.07.02-62):

This request for additional information (RAI) is necessary for the staff to determine if the application meets the requirements of 10 CFR Part 50, Appendix A, General Design Criteria 2; 10 CFR Part 50 Appendix S; and 10 CFR Part 100; as well as the guidance in NUREG-0800, 'Standard Review Plan for the Review of Safety Analysis for Nuclear Power Plants,' Chapter 3.7.2, "Seismic System Analysis."

Section 3.6.3 of MHI's Topical Report, MUAP-10006 (R0), presents the procedure for calculating the seismic dynamic earth pressures on the embedded walls of the R/B complex and the PS/Bs. The acceleration of 0.3g is specified for both the horizontal and vertical components of an earthquake in determining the seismic lateral pressure for the exterior walls of the basements. However, the quasi-static acceleration values of 0.55g (Table 4-7) and as high as 0.84g (Table 4-10) are shown at the base and below the ground surface for Category I structures. Provide a justification for not specifying these values in determining the seismic lateral pressure.

Also, the procedure includes a factor of 20% that represents an additional design margin to account for uncertainties in the embedment soil properties and the applied methodology.

The staff requests that the applicant provide the basis for selecting a 20% increase for the additional design margin to account for uncertainties in the embedment soil properties and the applied methodology. Provide relevant data or studies performed to support the technical position.

ANSWER:

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-10355 (ML110040071).

The 20% increase factor is no longer used in the methodology for computing earth pressures and the subsection of "Earth Pressure Design Load" has been deleted from Technical Report MUAP-10006, Rev. 3. The conservative envelope of lateral earth pressures to below-grade exterior walls are calculated in accordance with the requirements of Standard Review Plan

(SRP) 3.8.4, Acceptance Criterion II.4.H (Reference 1), as described in the response to RAI 212-1950, Question 3.7.2-13.

To compute dynamic (Wood's) pressure, the response to RAI 212-1950, Question 3.7.2-13, uses maximum average horizontal acceleration of 0.5g. This value was obtained as the maximum horizontal acceleration (averaged over a vertical section of the embedded walls) from 12 sections/groups along the basemat walls as shown in Figure 1 of the response to RAI 212-1950, Question 3.7.2-13. This value envelops the soil-structure interaction (SSI) and structure-soil-structure interaction (SSSI) analysis results of the fully embedded reactor building (R/B) complex. The previous quasi-static acceleration values of 0.55g and 0.84g in Technical Report MUAP-10006, Rev. 3, are local (pointwise) accelerations that are not representative for calculating the dynamic pressure in a vertical section.

References:

1. Other Seismic Category I Structures, NUREG-0800, SRP 3.8.4, Rev. 3, U.S. Nuclear Regulatory Commission, Washington, DC, May, 2010.

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 the Technical/Topical Report.

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