RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

03/29/2013

US-APWR Design Certification Mitsubishi Heavy Industries Docket No. 52-021 RAI NO.: NO. 340-2004 REVISION 0 SRP SECTION: 03.08.05 - Foundations APPLICATION SECTION: 3.8.5 DATE OF RAI ISSUE: 04/21/2009

QUESTION NO. 03.08.05-09:

In DCD Subsection 3.8.5.4.2, the first paragraph (Page 3.8-72) states, "Horizontal bearing reactions on the side walls below grade are conservatively neglected for the analysis of the basemat. However, horizontal forces are considered in the analysis of the wall."

The applicant is requested to provide the following information:

- (a) Do the words "analysis of the basemat" include the stability analysis, such as sliding and overturning of, and the strength of, the basemat? Provide a technical basis which demonstrates that it is conservative to neglect the soil reactions on the side walls below grade for both the stability and strength of the basemat.
- (b) Explain how the horizontal forces considered in the analysis and design of the wall were calculated.

ANSWER:

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-09363 (ML091900557).

(a) The overturning stability analysis considers the contribution of static soil pressure (atrest lateral earth pressure), lateral earth pressure due to surcharge of 450 psf (Reference 1), and dynamic (Wood's) pressure acting in the same direction of horizontal inertia forces on the below-grade walls and basemat, but conservatively consider only static at-rest pressure in resisting overturning loads. This is conservative because any passive reaction forces acting on the side walls and basemat below grade will reduce the global overturning effects during the stability analysis.

No lateral earth pressure on the below grade walls is considered in nonlinear sliding analysis. This aspect is discussed in Section 4.5.3 of the Technical Report MUAP-12002, Rev. 1.

Soil pressures acting on the below grade side walls and basemat were considered for the strength design as discussed in (b) below. MHI recognizes that the last two sentences of the first paragraph of Design Control Document (DCD) Subsection 3.8.5.4.2 can be confusing, and were deleted.

(b) An explanation of the calculation method for horizontal forces acting on below-grade walls is presented in the response to RAI 212-1950, Question 3.7.2-13.

References

1. <u>US-APWR Standard Design Civil Structural Design Criteria</u>, Mitsubishi Heavy Industries, N0-CF00003, Revision 4, August, 2012.

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.