
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

1/31/2013

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: 11/15/10

QUESTION NO. RAI 03.07.02-25 (03.07.02-52):

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."

According to the reference sections of MHI's Topical Reports, MUAP-10001 (R1) and MUAP-10006 (R0), the SSI analyses reported were performed using ACS SASSI Version 2.2. Version 2.2.1 of ACS SASSI is subject to a 10 CFR Part 21.21 report regarding numerical instabilities that may occur with high numbers of soil layers even though the properties and number of layers are within the parameters stated in the User's Manual. In order for the staff to complete the evaluation of the SSI analysis, the staff requests the applicant to provide additional information demonstrating that the SSI results are valid and meet the guidelines of SRP 3.7.2.II.4

ANSWER:

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

Technical Reports MUAP-10001, Rev. 1 and MUAP-10006, Rev. 0 are superseded and their relevant information has been incorporated into Technical Report MUAP-10006, Rev. 3. The calculations documenting the soil-structure interaction (SSI) analyses described in Technical Report MUAP-10006, Rev. 3, were performed with ACS SASSI Version 2.3.0, including Option A and NQA Option FS. This newer version of SASSI has been significantly improved to address the numerical stability issues that were described in the 10 CFR Part 21.21 report. As discussed in "2009 ACS SASSI Focused Maintenance Memo #1 for ACS SASSI NQA V 2.3.0," dated November 11, 2009, the SITE module contained within SASSI 2.3.0 was tested by the software vendor for up to 125 soil layers for deep non-uniform soil sites and demonstrated to show high numerical robustness. Further, the SASSI User Manuals contain guidance on soil layering modeling to mitigate potential misuse of the program. The guidance of the SASSI User Manuals was followed in the SSI analyses, and as shown in Tables 03.3.1-1 through 03.3.1-6 in Technical Report MUAP-10006, the number of soil layers used in the reactor building complex SSI models is less than 125. Part 3 of Technical Report MUAP-10006 documents SSI results that meet the guidelines of SRP 3.7.2.II.4.

References 02-1 and 03-2 of Technical Report MUAP-10006, Rev. 3 and Reference 3.7-17 in Tier 2 of the DCD have been revised to state:

ACS SASSI, Version 2.3.0 including “Option A” and NQA “Option FS,” An Advanced Computational Software for 3-D Dynamic Analysis Including Soil Structure Interaction, User Manuals Revision 7.0, Gbiocel Predictive Technologies, Inc., September 26, 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 a Technical/Topical Report.

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