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**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

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1/31/2013

**US-APWR Design Certification**

**Mitsubishi Heavy Industries**

**Docket No. 52-021**

**RAI NO.:** NO. 643-4967 REVISION 2  
**SRP SECTION:** 03.07.01 – Seismic Design Parameters  
**APPLICATION SECTION:** 3.7.1  
**DATE OF RAI ISSUE:** 10/04/10

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**QUESTION NO. RAI 03.07.01-09 (03.07.01-15):**

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 3.7.1, "Seismic Design Parameters."

In Section 1.0, "Introduction," of MHI's Topical Report, MUAP-10001, Revision 1, "Seismic Design Bases of the US-APWR Standard Plant," it states that the seismic design of the standard plant structures is based on a set of SSI analyses performed using the computer program ACS SASSI, which provides a representation of the dynamic properties of the building, and captures the SSI effects related to the flexibility of the basemat foundation.

In the review of the SSI model referenced in the report, the staff identified that Version 2.2 of the ACS SASSI is used in the SSI analyses for the US-APWR standard plant. Since irregularities were observed in other SSI analyses using Version 2.2 of the ACS SASSI computer code in an Event Notification Report, Number 45343, dated September 14, 2009, the staff requests the applicant to provide technical bases for using Version 2.2 of the ACS SASSI program to perform the SSI analyses for the US-APWR standard plant and to validate the analysis results.

Reference: USAPWR Seismic Design Report MUAP-10001, rev 1; dated May 13, 2010; ML101400073

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**ANSWER:**

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-10308 (ML103200405).

Technical Reports MUAP-10001, Rev. 1 is superseded and its relevant information has been incorporated into Technical Report MUAP-10006, Rev. 3.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 & NQA Option FS. This newer version of SASSI has been significantly improved to address the numerical irregularities cited in the above Event Notification 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 Tier 2 DCD Reference 3.7-17 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,” Users Manuals Revision 7.0, Ghiocel 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.

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