MITSUBISHI HEAVY INDUSTRIES, LTD.
16-5, KONAN 2-CHOME, MINATO-KU
TOKYO, JAPAN

September 22, 2011

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: Mr. Jeffery A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-11325

Subject: MHI's Response to US-APWR DCD RAI No. 812-5983 Revision 3(SRP 03.07.02)

Reference: 1) "Request for Additional Information No. 812-5983 Revision 3, SRP Section: 03.07.02 – Seismic System Analysis," dated 8/23/2011.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 812-5983, Revision 3."

Enclosed is the response to the RAI contained within Reference 1. This transmittal completes the response to this RAI.

Please contact Dr. C. Keith Paulson, Senior Technical Manager, Mitsubishi Nuclear Energy Systems, Inc. if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,

Y. Ogata

Yoshiki Ogata,
General Manager- APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosure:

1. Response to Request for Additional Information No. 812-5983, Revision 3

CC: J. A. Ciocco
C. K. Paulson

Contact Information
C. Keith Paulson, Senior Technical Manager
Mitsubishi Nuclear Energy Systems, Inc.
300 Oxford Drive, Suite 301
Monroeville, PA 15146
E-mail: ck_paulson@mnes-us.com
Telephone: (412) 373-6466

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Docket No. 52-021
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Enclosure 1

UAP-HF-11325
Docket No. 52-021

Response to Request for Additional Information No. 812-5983,
Revision 3

September, 2011

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

9/22/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 812-5983 REVISION 3**
SRP SECTION:	**03.07.02 – Seismic System Analysis**
APPLICATION SECTION:	**3.7.2**
DATE OF RAI ISSUE:	**8/23/2011**

QUESTION NO. RAI 03.07.02-109:

In section 3.7.2.1 of the DCD (R3), the Applicant stated that the seismic response of standard plant seismic category I and II structures is obtained from site-independent analyses performed using three-dimensional SSI models with the program ACS SASSI. The applicant is requested to clarify whether the flexible volume method or subtraction method is used in performing the SSI analysis with ACS SASSI computer program and provide the technical basis and justification for the method used in the SSI analysis.

ANSWER:

The design-basis SSI analyses for the standard plant seismic category I and II structures are performed using surface-mounted dynamic models as stated in MHI Technical Reports MUAP-10006 Revision 1 Sections 3.2, 3.7, and 4.0; MUAP-11001 Revision 1 Section 4.1; and MUAP-11002 Revision 0 Sections 5.3 and 5.4. The flexible volume and subtraction methods are applicable to SSI analyses of embedded models and are not applicable to the design-basis SSI analysis for the US-APWR standard plant seismic category I and II structures.

MHI Technical Report MUAP-11007 Revision 0 documents seismic SSI parametric evaluations performed in order to assess the effects of embedment on the Reactor Building complex. The parametric evaluations documented in MUAP-11007 Section 4.1 use the flexible volume method. Both the subtraction method and the flexible volume method can be technically acceptable methods (as well as the modified subtraction method that is currently available in ACS-SASSI). It is noted that a Defense Nuclear Facilities Safety Board (DNFSB) letter issued on April 8, 2011 (http://www.hss.energy.gov/deprep/2011/FB11A08A.PDF) cites potential technical and software quality assurance issues related to the subtraction method. The technical justification for the use of the flexible volume method in the evaluations documented in Technical Report MUAP-11007 is that it is computationally more robust and accurate than the subtraction method and, therefore, has broader applicability with respect to soil conditions and input motion, particularly high-frequency input motion.

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.
