

  
**MITSUBISHI HEAVY INDUSTRIES, LTD.**  
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TOKYO, JAPAN

October 28, 2010

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-10293

**Subject:** MHI's Responses to US-APWR DCD RAI No. 614-4853 (SRP 03.09.02)

**Reference:** 1) "Request for Additional Information No. 614-4853 Revision 0, SRP Section: 03.09.02 - Dynamic Testing and Analysis of Systems Structures and Components," dated 08/13/2010.  
2) "MHI's Responses to Request for Additional Information No. 614-4853, Revision 0, UAP-HF-10254" dated September 16, 2010  
3) "MHI's Responses to Request for Additional Information No. 614-4853, Revision 0, UAP-HF-10259" dated September 29, 2010

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Responses to Request for Additional Information No. 614-4853, Revision 0."

Enclosed is the response to one (1) RAI contained within Reference 1. This is the response to RAI 3.9.2-91. Three (3) other RAI responses contained in Reference 1 were previously provided in Reference 2. The three (3) remaining RAI responses contained in Reference 1 were previously provided in Reference 3.

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,



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

Enclosure:

1. Response to Request for Additional Information No. 614-4853, Revision 0

DD 81  
NRD

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

Contact Information

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Docket No. 52-021  
MHI Ref: UAP-HF-10293

**Enclosure 1**

**UAP-HF-10293  
Docket No. 52-021**

**Response to Request for Additional Information No. 614-4853,  
Revision 0**

**October, 2010**

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**RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION**

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**10/28/2010**

**US-APWR Design Certification  
Mitsubishi Heavy Industries  
Docket No. 52-021**

**RAI NO.:** NO. 614-4853  
**SRP Section:** 03.09.02 – Dynamic Testing and Analysis of Systems  
Structures and Components  
**APPLICATION SECTION:** 3.9.2  
**DATE OF RAI ISSUE:** 08/13/2010

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**QUESTION NO.: RAI 3.9.2-91**

In RAI 498-3782, question 03.09.02-78, the applicant was requested to discuss the analysis performed to assess adverse flow effects on the reactor piping system due to the increased flow velocity at the vessel outlet nozzle above that of the current 4-loop reactors. In its response, MHI does not give, or reference, any details of the analysis and just mentions that based on the analysis of the 4-loop reactor, there is sufficient margin of safety against flow-induced vibration. Since this response does not provide the requested information, the staff's concerns remain unresolved.

The applicant is therefore requested to discuss the analysis performed to assess adverse flow effects on the reactor piping system due to the increased flow velocity at the vessel outlet nozzle as identified in Table 2.1-1 of MUAP-07027-P (R1). The applicant may refer to other sections of the DCD or to technical reports which address the concerns expressed in this RAI.

Reference: MHI's Response to US-APWR DCD RAI No. 498-3782; MHI Ref: UAP-HF10008; dated January 15, 2010; ML100200161.

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**ANSWER:**

MHI planned to adopt our thermowell design of the current 4-loop reactor for US-APWR reactor coolant loop piping. This thermowell design was confirmed to have sufficient margin against flow-induced vibration under the flow condition of US-APWR reactor. In concrete terms, it was confirmed that reduced velocity ( $V/f_1D$ ) is less than 1 in accordance with ASME Code Section III Appendix N-1324 and that generated stress is less than the lower bound of design fatigue curve.

However, this plan has been changed and MHI determined to procure thermowell from a thermocouple supplier. MHI is going to procure thermowell which satisfies requirements for avoidance of flow-induced vibration under condition of the US-APWR.

**Impact on DCD**

There is no impact on the DCD.

**Impact on COLA**

There is no impact on the COLA.

**Impact on PRA**

There is no impact on the PRA.