

## US-APWRRRAIsPEm Resource

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**From:** Ciocco, Jeff  
**Sent:** Monday, March 11, 2013 10:10 AM  
**To:** us-apwr-rai@mhi.co.jp; US-APWRRRAIsPEm Resource  
**Cc:** Wong, Yuken; Colaccino, Joseph; Galvin, Dennis; Hamzehee, Hossein  
**Subject:** US-APWR Design Certification Application RAI 1013-7031 (3.9.2)  
**Attachments:** US-APWR DC RAI 1013 EMB 7031.pdf

MHI,

The attachment contains the subject Request for Additional Information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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# REQUEST FOR ADDITIONAL INFORMATION 1013-7031

Issue Date: 3/11/2013

Application Title: US-APWR Design Certification - Docket Number 52-021

Operating Company: Mitsubishi Heavy Industries

Docket No. 52-021

Review Section: 03.09.02 - Dynamic Testing and Analysis of Systems Structures and Components

Application Section: 3.9.2

## QUESTIONS

03.09.02-103

In the response to RAI No. 930-6494, 05.04.02.01-13 dated December 12, 2012, the applicant attributes the tube-to-tube wear and tube-to-support [anti vibration bar (AVB) and tube support plate (TSP)] to the high steam quality and small contact force with AVBs. For the steam generators of the US-APWR, the applicant states that the steam quality will be lower and the contact force will be more effective than that of the San Onofre (SONGS) replacement steam generators (RSG), without discussing the effect of these parameters on the critical velocity of the fluid elastic instability.

The applicant is requested to:

- (a) Provide a comparison of technical data of both steam generators (SONGS & US-APWR) to illustrate that the critical velocity has been exceeded in the SONGS case but will not be exceeded in the US-APWR case,
- (b) Explain any design differences between the SG of the US-APWR and the Fort Calhoun RSGs and clarify the effect of these differences (if any) on the flow-induced vibration response of the tube bundle.
- (c) Explain how the contact force of the AVBs will be checked to ensure it is sufficiently high to prevent in-plane tube instability.
- (d) Explain why the wear at the tube support plates is considered to be caused by turbulence excitation and not by in-plane tube instability.

The staff requests the applicant to include the information in the DCD, MUAP-07027, or a new report.

03.09.02-104

The staff requests the applicant to provide the preliminary design of the steam generator tube bundle and the design criteria for the steam generator tubes and retainer bars against flow-induced excitations, including random turbulence, fluid elastic instability (out-of-plane and in-plane), and vortex shedding.

## **REQUEST FOR ADDITIONAL INFORMATION 1013-7031**

The staff requests the applicant to include the information in the DCD, MUAP-07027, or a new report.

