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TOKYO, JAPAN

June 28, 2010

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

Attention: Mr. Jeffrey A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-10182

Subject: MHI's Response to US-APWR DCD RAI No.588-4617 RE-ISSUE

- References:**
- 1) "Request for Additional Information No. 588-4617 Revision RE-ISSUE, SRP Section: 05.03.02 - Pressure-Temperature Limits, Upper-Shelf Energy, and Pressurized Thermal Shock, Application Section: 05.03.02/ Technical Report MUAP-09016, Rev. 1," dated June 17, 2010
 - 2) "MHI's Responses to US-APWR DCD RAI No.588-4617 REVISION 0," (MUAP-HF-10169), dated June 14, 2010.

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. 588-4617 RE-ISSUE."

Enclosed is the response to an RAI (Question 05.03.02-8) contained within Reference 1. Of these RAIs, the responses to Question 05.03.02-2 through 05.03.02-7 were already submitted in Reference 2.

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

Sincerely,



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

Enclosures:

1. Response to Request for Additional Information No. 588-4617 RE-ISSUE

DOB
NRO

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

Contact Information

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Enclosure 1

UAP-HF-10182
Docket Number 52-021

Response to Request for Additional Information
No. 588-4617 RE-ISSUE

June 2010

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

6/28/2010

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

RAI NO.: NO. 588-4617 RE-ISSUE
SRP SECTION: 05.03.02 – Pressure-Temperature Limits, Upper-Shelf Energy, and Pressurized Thermal Shock
APPLICATION SECTION: 05.03.02/ Technical Report MUAP-09016, Rev.1
DATE OF RAI ISSUE: 6/17/2010

QUESTION NO.: 05.03.02-8

Technical Report MUAP-09016, Rev.1, Table 7-1, Footnote 7, states that the margin value is determined by $\sqrt{\sigma_i^2 + \sigma_\Delta^2}$. However, in accordance with Regulatory Guide 1.99, Rev.2, the margin value is determined by $2\sqrt{\sigma_i^2 + \sigma_\Delta^2}$. Clarify which equation was used to calculate the margin and revise the technical report accordingly.

ANSWER:

The margin values contained in Table 7-1 of Technical Report MUAP-09016, Rev.1 were determined by $2\sqrt{\sigma_i^2 + \sigma_\Delta^2}$ in accordance with Regulatory Guide 1.99, Rev.2. The equation specified by Footnote 7 of Table 7-1 is an editorial error. In order to clarify the equation used to calculate the margin values, Footnote 7 of Table 7-1 will be revised as shown in the attached marked-up page.

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.

Table 7-1 Calculation of RT_{NDT} / RT_{PTS} at EOL (60EFPY)

Location ⁽⁸⁾		Initial RT_{NDT} (°F)	$f^{(1)}$	$FF^{(2)}$	$CF^{(3)}$ (°F)	$\Delta RT_{NDT}^{(4)}$ (°F)	$\sigma_1^{(5)}$ (°F)	$\sigma_\Delta^{(6)}$ (°F)	Margin ⁽⁷⁾ (°F)	ART (°F)
Beltline Region Forgings	ID	0	0.98	0.99	31	30.8	47	45.4	45.9	76.7
	1/4-T		0.52	0.82		25.4	17	12.7	42.4	67.8
	3/4-T		0.15	0.50		15.6	17	7.8	37.4	53.0
Beltline Region Weld	ID	-20	0.85	0.95	108	403.4	47	28	65.5	448.6
	1/4-T		0.45	0.78		84.3	17	28	65.5	129.8
	3/4-T		0.13	0.47		50.9	17	25.5	61.2	92.1

Notes:

- Fluence f (10^{18} n/cm², E>1MeV) at a depth of x (in inches) based on the fluence f_{surf} (10^{18} n/cm², E>1MeV) at the ID is calculated by:
 $f = f_{surf} (e^{-0.24x})$, where f_{surf} is the fluence of ID from Table 3-1.
- FF (Fluence Factor) = $f^{0.28 - 0.10 \log f}$
- Values from Table 1 and Table 2 of Regulatory Guide 1.99 (Reference 7) for Cu = 0.05 wt% and Ni = 1.0 wt% for the forgings, and Cu = 0.08 wt% and Ni = 0.95 wt% for the weld material.
- $\Delta RT_{NDT} = CF \times FF$.
- Standard deviation for Initial RT_{NDT} . 17°F selected from Table-P Footnote (5) of Reference 14.
- Standard deviation for ΔRT_{NDT} . σ_Δ = smaller of 17°F or $0.5 \times \Delta RT_{NDT}$ for the forgings, and smaller of 28°F or $0.5 \times \Delta RT_{NDT}$ for the weld material.
- Margin determined by $\geq \sqrt{\sigma_1^2 + \sigma_\Delta^2}$
- $T = 10.4"$, the base metal thickness at the beltline region.

- The title and contents of Table 7-1 will be revised in accordance with the response to Question No. 05.03.02-7.
- Note 8 will be added in accordance with the response to Question No. 05.03.02-3.