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TOKYO, JAPAN

July 13, 2009

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-09373

Subject: MHI's Response to US-APWR DCD RAI No. 390-3088 Rev. 0

Reference: 1) "Request for Additional Information No. 390-3088 Revision 0, SRP Section: 15.00.03 – Design Basis Accidents Radiological Consequence Analyses for Advanced Light Water Reactors, Application Section: 15.0.3" dated 6/15/2009.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") documents entitled "Response to Request for Additional Information No. 390-3088 Rev. 0".

Enclosed are the responses to 1 RAI contained within References 1.

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,

Y. Ogata

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

Enclosure:

1. Response to Request for Additional Information No. 390-3088 Revision 0

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

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Enclosure 1

UAP-HF-09373
Docket No. 52-021

Response to Request for Additional Information No. 390-3088
Revision 0

July 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/13/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No.52-021

RAI NO.:	**NO. 390-3088 REVISION 0**
SRP SECTION:	**15.00.03 – Design Basis Accidents Radiological Consequence Analyses for Advanced Light Water Reactors**
APPLICATION SECTION:	**DCD 15.0.3**
DATE OF RAI ISSUE:	**6/15/2009**

QUESTION NO. : 15.00.03-29

Background

In order to verify compliance with the requirements of SRP 15.0.3 Acceptance Criterion 1 [based on 10 CFR Part 50, Section 50.34(a)(1)], as it relates to evaluation and analysis of fission product releases, the pH of the containment sump water must be raised above 7.0 after a LOCA to prevent revolatilization of iodine. The staff requests additional information in order to complete its confirmatory calculation of the sump pH.

The response to RAI 6.5.2-2 (Reference 1) states, "Dissolved 44,100 lb ton of NaTB into 879,740 gallon of total water, the concentration of NaTB is 0.016 mol/l. Therefore, the borate concentration generated by the dissolution of NaTB is 0.03 mol/l grades, which is taken into account the quantity neutralized from the acid (HI, HNO3, HCl) generated in the accident."

However, the volume of 879,740 gal is inconsistent with the sum of the RWSP maximum volume of 651,000 gal from DCD Table 6.5.2-1 plus the 134,730 gal of RCS water assumed to be discharged to the sump for the purpose of the pH analysis as stated in the response to RAI 15.00.03-27 (Reference 2)

Further, for the purposes of the sump chemical effects testing, the volume of sump water was assumed to be 43,930 ft^3 (329,000 gal), (Reference 3) which is consistent with the value given in DCD Table 6.2.1-5 for design evaluation.

The staff acknowledges that a different water volume may have been used to calculate the amount of NaTB needed to raise the pH above 7.0 than was used to calculate the pH for the chemical effects tests.

The total volume of the ineffective pools, which is the volume of water that does not mix with bulk of the RWSP water and thus does not dissolve the NaTB, was given as 297,000 gal in Table 3-10 of the US-APWR Sump Strainer Performance report (Reference 4). Additionally, the same reference indicates the return water on the way to the RCS has a volume of approximately 137,000 gal. It is not clear to the staff whether the ineffective pools and the return water were taken into account when calculating the minimum amount of NaTB necessary to raise the post-accident pH above 7.0.

Requested Information

1. What volume of RWSP water was assumed in the calculation of postaccident pH, for the purpose of determining the minimum amount of NaTB buffer necessary?

2. Was the water in the ineffective pools and the return water on the way to the RCS accounted for when calculating the minimum amount of buffer necessary to increase the pH above 7.0?

References

1. Letter from Yoshiki Ogata, MHI, to NRC dated March 24, 2009; Docket No. 52-021 MHI Ref: UAP-HF-09121; Subject: MHI's Response to US-APWR DCD RAI No. 234 (ADAMS Accession No. ML0908502111)

2. Letter from Yoshiki Ogata, MHI, to NRC dated March 3, 2009; Docket No. 52-021 MHI Ref: UAP-HF-09068; Subject: MHI's Response to US-APWR DCD RAI No. 276 (ADAMS Accession No. ML090680229)

3. US-APWR Sump Debris Chemical Effects Test Plan, MUAP-08006-P R(1), November, 2008 (ADAMS Accession No. ML083390366)

4. US -APWR Sump Strainer Performance, MUAP-080001-P (R2), December 2008; ADAMS Accession No. ML090050043

ANSWER:

1. The volume of water assumed in calculating the post-accident pH to determine the minimum required amount of NaTB buffer is 879,690 gal (3,330 m^3). The concentration of borated water in all the water including ineffective pool and return water to recirculation water is assumed to be the controlled value (4,200 ppm), where the volume of recirculation water is estimated to be large so as to prevent an increase in pH. In our earlier response to RAI No.234, we made a mistake in converting 3,330 m^3 to its gallon equivalent; that is, 879,740 (incorrect) gal instead of 879,690 gal (correct), which has been corrected in this response. We will also correct our response to RAI No.234.

2. As mentioned in Item 1 above, when determining the minimum amount of NaTB conditioning agent required to raise the pH above 7, the volume of all the water is conservatively calculated, including return water to recirculation water and ineffective pool.

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.