MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

July 27, 2012

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-12217

Subject: MHI's 2nd Amended Response to US-APWR DCD RAI No. 839-6103 Revision 3 (SRP 06.02.02)

References:
[1] "Request for Additional Information No. 839-6103 Revision 3, SRP Section: 06.02.02 – Containment Heat Removal System –Application Section: 6.2." dated October 14, 2011 (ML112920559).
[2] MHI Letter UAP-HF-12021, "MHI's Response to US-APWR DCD RAI No. 839-6103 Revision 3 (SRP 06.02.02)" dated January 31, 2012 (ML12033A282).
[3] MHI Letter UAP-HF-12127, "MHI's Amended Response to US-APWR DCD RAI No. 839-6103 Revision 3 (SRP 06.02.02)" dated May 30, 2012 (ML12153A098).
[4] MHI Letter UAP-HF-12131, "MHI's 2nd Amended Response to US-APWR DCD RAI No. 815-5986 Revision 3 (SRP 06.03)," dated May 29, 2012 (ML12153A080).

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "2nd Amended Response to Request for Additional Information No. 839-6103 Revision 3 (SRP 06.02.02)".

In Reference 2, MHI provided the original response for Questions 06.02.02-69 through 06.02.02-73 to the NRC's Request for Additional Information ("RAI") in Reference 1. Reference 3 subsequently provided an amended response for Questions 06.02.02-69 through 06.02.02-73 that incorporated the design change that is discussed in Reference 4.

This response supersedes the previous responses to Question 06.02.02-73 that were transmitted in References 2 and 3, specifically correcting typographical errors in the previous response (Reference 3).

As indicated in the enclosed materials, this document contains information that MHI considers proprietary, and therefore should be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4) as trade secrets and commercial or financial information which is privileged or confidential. A non-proprietary version of the document is also being submitted with the information identified as proprietary redacted and replaced by the designation "[ ]".

This letter includes a copy of the proprietary version (Enclosure 2) of the response, a copy of the non-proprietary version (Enclosure 3) of the response, and the Affidavit of Yoshiki Ogata (Enclosure 1) which identifies the reasons MHI respectfully requests that all materials

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designated as "Proprietary" in Enclosure 2 be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4).

Please contact Mr. Joseph Tapia, General Manager of Licensing Department, 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,
Director - APWR Promoting Department
Mitsubishi Heavy Industries, LTD.

Enclosures:

1. Affidavit of Yoshiki Ogata

2. 2nd Amended Response to Request for Additional Information No. 839-6103 Revision 3 (SRP 06.02.02) (proprietary version)

3. 2nd Amended Response to Request for Additional Information No. 839-6103 Revision 3 (SRP 06.02.02) (non-proprietary version)

CC: J. A. Ciocco
J. Tapia

Contact Information
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Enclosure 1

Docket No. 52-021
MHI Ref: UAP-HF-12217

MITSUBISHI HEAVY INDUSTRIES, LTD.

AFFIDAVIT

I, Yoshiki Ogata, state as follows:

1. I am Director, APWR Promoting Department, of Mitsubishi Heavy Industries, LTD ("MHI"), and have been delegated the function of reviewing MHI's US-APWR documentation to determine whether it contains information that should be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4) as trade secrets and commercial or financial information which is privileged or confidential.

2. In accordance with my responsibilities, I have reviewed the enclosed document entitled "2nd Amended Response to Request for Additional Information No. 839-6103 Revision 3 (SRP 06.02.02)" dated July 27, 2012, and have determined that portions of the document contain proprietary information that should be withheld from public disclosure. Those pages containing proprietary information are identified with the label "Proprietary" on the top of the page and the proprietary information has been bracketed with an open and closed bracket as shown here "[ ]". The first page of the document indicates that all information identified as "Proprietary" should be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4).

3. The information identified as proprietary in the enclosed document has in the past been, and will continue to be, held in confidence by MHI and its disclosure outside the company is limited to regulatory bodies, customers and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and is always subject to suitable measures to protect it from unauthorized use or disclosure.

4. The basis for holding the referenced information confidential is that it describes the unique design and methodology developed by MHI for performing the nuclear design of the US-APWR reactor.

5. The referenced information is being furnished to the Nuclear Regulatory Commission ("NRC") in confidence and solely for the purpose of information to the NRC staff.

6. The referenced information is not available in public sources and could not be gathered readily from other publicly available information. Other than through the provisions in paragraph 3 above, MHI knows of no way the information could be lawfully acquired by organizations or individuals outside of MHI.

7. Public disclosure of the referenced information would assist competitors of MHI in their design of new nuclear power plants without incurring the costs or risks associated with the design of the subject systems. Therefore, disclosure of the information contained in the referenced document would have the following negative impacts on the competitive position of MHI in the U.S. nuclear plant market:

A. Loss of competitive advantage due to the costs associated with development of methodology related to the analysis.

B. Loss of competitive advantage of the US-APWR created by benefits of modeling information.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information and belief.

Executed on this 27th day of July 2012.

Y. Ogata

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

Enclosure 3

UAP-HF-12217
Docket No. 52-021

2nd Amended Response to Request for Additional Information
No. 839-6103 Revision 3 (SRP 06.02.02)

July 2012
(Non-Proprietary)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/27/2012

US-APWR Design Certification

Mitsubishi Heavy Industries, Ltd.

Docket No. 52-021

RAI NO.:	**NO. 839-6103 REVISION 3**
SRP SECTION:	**06.02.02 – Containment Heat Removal System**
APPLICATION SECTION:	**6.2**
DATE OF RAI ISSUE:	**10/14/2011**

QUESTION NO. : 06.02.02-73

Follow-up to RAI 740-5719 response:

During a design basis accident, water spilled from the reactor and from containment spray can collect (pool) on floors inside containment. The 25' 3" elevation floor, often referred to as the 2nd floor, contains the floor inside the SG compartment and the floor outside the SG compartment. MHI calculates a water height on the floor outside the SG compartment and applies this water height to the entire 2nd floor. The staff request that MHI provide justification that use of a water height calculated from outside the SG compartment is appropriate for use on the floor inside the SG compartment. As part of the response, provide the method of analysis, inputs and assumptions, and justification for their selection.

ANSWER:

As the staff indicated, the water height outside the SG compartments ("outside") and inside the SG compartments ("inside") during an accident will differ due to the pressure loss at the narrow entrance shown in Figure 2.

1. Conditions

Due to the design change described in Enclosure 2 of Reference 1, the water flow path changed as shown in Figure 1. After the design change, spray/blowdown water will flow from "inside" to the RWSP through the reactor cavity or the header compartment and there is no direct flow path from "outside" to the RWSP. Spray water coming to the "outside" will flow to the "inside" through four narrow entrances located in the secondary shield wall at 45, 135, 225 and 315 degrees. Water coming to the "outside" will be about 30% of the total spray flow, because most of spray drops on 4th floor and the dropped water goes to the "inside" through four large openings on 4th floor above the reactor coolant pumps. The flow rate from "outside" to "inside" is:

Flow rate from "outside" to "inside" through one entrance

$= 0.62 m^3/sec$ (9800gpm) × 30 % / 4

$= 0.0465\ m^3/sec$ (approx. $1.6\ ft^3/sec$)

Figure 1: Water Flow Path Model (Post-LOCA)

Figure 2: Model of Water Depth Difference between "Inside" and "Outside"

2. Calculations

3. **Design basis overflow height**

4. **Sensitivity of overflow height**

5. References

1) MHI Letter No. UAP-HF-12131, "MHI's 2nd Amended Response to US-APWR DCD RAI No. 815-5986 Revision 3 (SRP 06.03)", dated May 29, 2012.
2) MHI Letter No. UAP-HF-12126, "MHI's 3rd Amended Response to US-APWR DCD RAI No. 740-5719 Revision 2 (SRP 06.02.02)", dated May 30, 2012.
3) Rao N.S. Govinda, Muralidhar D. "Discharge characteristics of weirs of finite crest width". J La Houille Blanche 1963;18(5):537–45.
4) MHI Letter No. UAP-HF-12218, "MHI's Amended Response to US-APWR DCD RAI No. 921-6415 (SRP 06.02.02)", dated July 2012.
5) MHI Letter No. UAP-HF-12135, "US-APWR DCD GSI-191 Tracking Report (May 2012 version)", dated June 1, 2012.
6) MHI Letter No. UAP-HF-12125, MUAP-08001 Revision 6, "US-APWR Sump Strainer Performance", dated June 1, 2012.

Impact on DCD

See note below.

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

See note below.

Impact on Technical/Topical Report

See note below.

Note
Impacts of the response on the DCD and Technical Report due to this response are reflected to the GSI-191 DCD Tracking Report (Reference 5) and the revised Technical Report (Reference 6)