**MITSUBISHI HEAVY INDUSTRIES, LTD.**
16-5, KONAN 2-CHOME, MINATO-KU
TOKYO, JAPAN

September 8, 2011

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-11300

**Subject: MHI's Responses to US-APWR DCD RAI No. 764-5805 Revision 3 (SRP 19)**

**Reference:** 1) "Request for Additional Information No. 764-5805 Revision 3, SRP Section: 19 – Probabilistic Risk Assessment and Severe Accident Evaluation, Application Section: SRP Chapter 19," dated June 6, 2011.
2) "MHI's Responses to US-APWR DCD RAI No. 764-5805 Revision 3," UAP-HF-11219, dated 6/6/2011.

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. 764-5805, Revision 3."

Enclosed are the responses to 2 RAIs contained within Reference 1. They are RAIs 19-529 and 530. This transmittal, in addition to 3 RAI responses previously provided in Reference 2, completes the response to this RAI.

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), a copy of the non-proprietary version (Enclosure 3), and the Affidavit of Yoshiki Ogata (Enclosure 1) which identifies the reasons MHI respectfully requests that all materials designated as "Proprietary" in Enclosure 2 be withheld from public disclosure pursuant to 10 C.F.R. § 2.390 (a)(4).

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.

D081
NRO

Sincerely,

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

Enclosures:

1. Affidavit of Yoshiki Ogata

2. Responses to Request for Additional Information No. 764-5805, Revision 3 (proprietary)

3. Responses to Request for Additional Information No. 764-5805, Revision 3 (non-proprietary)

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

Contact Information
C. Keith Paulson, Senior Technical Manager
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# Enclosure 1

Docket No. 52-021
MHI Ref: UAP-HF-11300

**MITSUBISHI HEAVY INDUSTRIES, LTD.**

**AFFIDAVIT**

I, Yoshiki Ogata, state as follows:

1. I am General Manager, 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 "Responses to Request for Additional Information No. 764-5805, Revision 3" dated September 8, 2011, 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 method of the structural analysis, developed by MHI (the "MHI Information")

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 unique design parameters.

B. Loss of competitive advantage of the US-APWR created by benefits of method of the structural analysis.

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 8th day of September, 2011.

Y. Ogata

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

Docket No. 52-021
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Enclosure 3

UAP-HF-11300
Docket Number 52-021

Responses to Request for Additional Information No. 764-5805,
Revision 3

September 2011
(Non-Proprietary)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

9/8/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 764-5805 REVISION 3

SRP SECTION: 19 – PROBABILISTIC RISK ASSESSMENT AND SEVERE ACCIDENT EVALUATION

APPLICATION SECTION: 19.2.4.2

DATE OF RAI ISSUE: 6/06/2011

## QUESTION NO. : 19-529

Staff reviewed the applicant's analysis results documented in report MUAP-10018-P (R0) and found them to be incomplete. As stated in RG 1.216, Section 1 (c), the pressures corresponding to initial yielding of the liner, reinforcing steel and pre-stressing tendons should be recorded. Further, the applicant did not address the acceptance criteria defined in RG 1.216 for demonstrating that the containment will remain essentially leak tight for the first 24 hours. RG 1.216, Section 3.1(d) states that the use of ASME Code service level C limits for metal containments or the factored load category for concrete containments is acceptable to demonstrate the deterministic performance goal for the first 24 hours. RG 1.216, Sections 1(d) and 2(a) states that these analyses should be based on ASME code specified minimum strengths for the specific grades of steel with temperature effects considered. ASME Boiler and Pressure Vessel Code, Section III, Division 2, Subarticle CC-3720, Table CC-3720-1, indicates that for the factored load category, the maximum allowable membrane strain in the liner is 0.003 (tensile) and 0.01 for combined membrane and bending strains. The applicant has not shown how the above acceptance criteria are satisfied. In addition, the applicant also has not indicated if the above acceptance criteria are satisfied for the period following the initial 24 hours after the onset of core damage as per RG 1.216, Section 3.2(a)(2).

To address the above issues, staff requests the applicant to (a) provide pressure corresponding to initial yielding of the liner, reinforcing steel, and pre-stressing tendons, and (b) address the acceptance criteria defined in ASME Boiler and Pressure Vessel Code, Section III, Division 2, Subarticle CC-3720, factored load category, considering pressure, dead and temperature loads. A summary of the supporting analyses and results should be included in DCD Section 19.2.4.

**ANSWER:**

**Impact on DCD**

There is no impact on the DCD.

**Impact on S-COLA**

There is no impact on the S-COLA.

**Impact on R-COLA**

There is no impact on the R-COLA.

**Impact on PRA**

There is no impact on the PRA

**Impact on Technical / Topical Report**

There is an impact on the Technical Report MUAP-10018 (R0).

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

9/8/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

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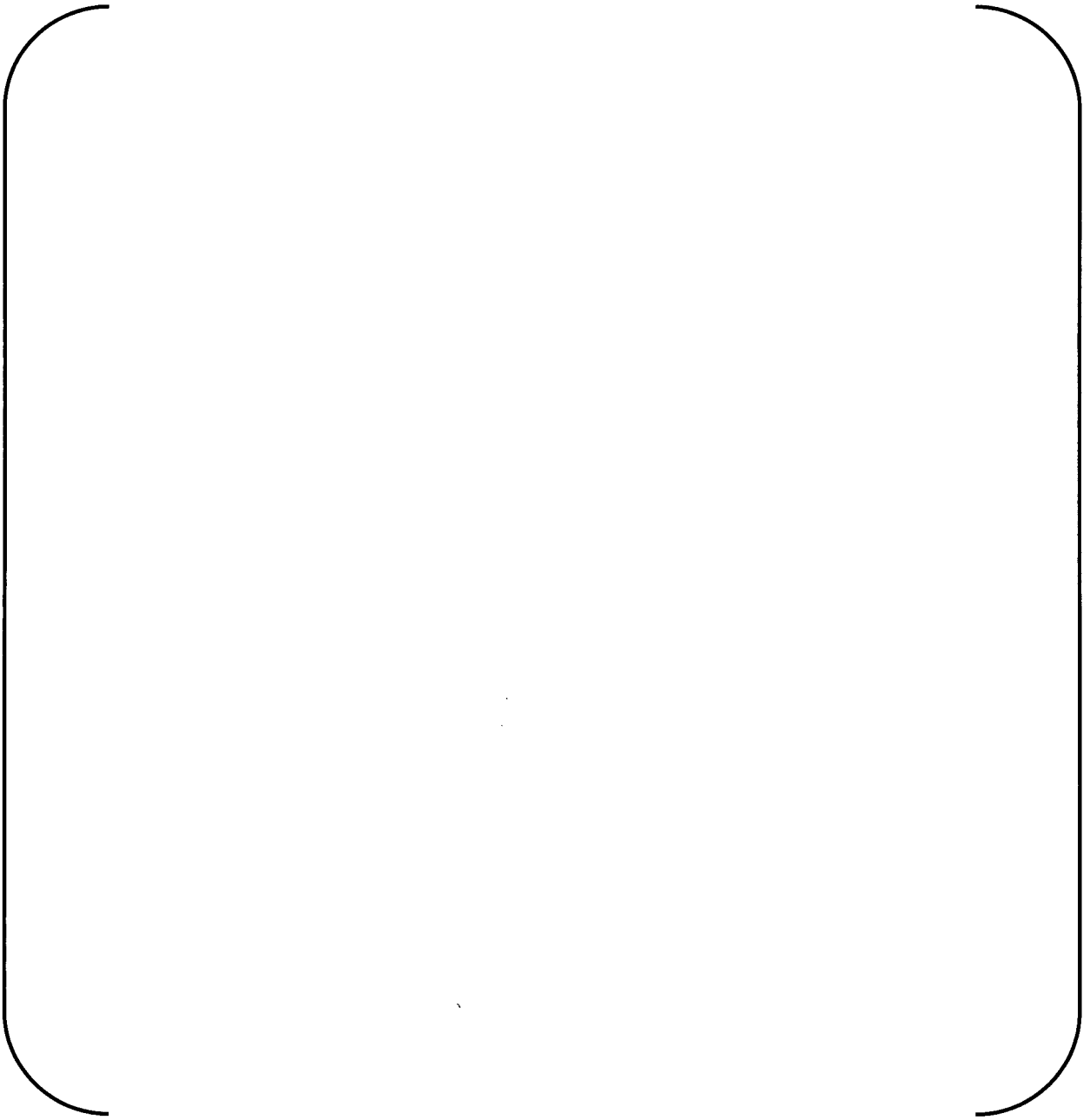
## QUESTION NO. : 19-530

Staff review of the analysis model finds that while the applicant's model of the PCCV indicated the limiting failure mode to be liner tearing, the applicant did not perform a detailed analysis of the equipment hatch and personnel airlocks to verify that these components do not fail at a lower pressure. RG 1.216, Section (1)(g), states that a complete evaluation of the internal capacity should address major containment penetrations such as equipment hatches, personnel airlocks, and major piping penetrations. The stress analysis results for steel components should be compared to the ASME Code service level C limits.
To address this issue, staff request the applicant to identify a COL action item for the COL applicant to address the severe accident analysis (corresponding to more likely severe accident challenges) of major penetrations such as the equipment hatch, personnel airlock, and major piping penetrations and document comparison to ASME Code limits.

ANSWER:



**Impact on DCD**

There is no impact on the DCD.

**Impact on S-COLA**

There is no impact on the S-COLA.

**Impact on R-COLA**

There is no impact on the R-COLA.

**Impact on PRA**

There is no impact on the PRA

**Impact on Technical / Topical Report**

There is an impact on the Technical Report MUAP-10018 (R0).