MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

July 3, 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-09341

Subject: MHI's Response to US-APWR DCD RAI No. 302-2327 Revision 2

Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") the document entitled "MHI's Response to US-APWR DCD RAI No. 302-2327 Revision 2". The enclosed materials provide MHI's response to the NRC's "Request for Additional Information (RAI) 302-2327 Revision 2," dated May 4, 2009.

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 in this package (Enclosure 3). In the non-proprietary version, the proprietary information, bracketed in the proprietary version, is replaced by the designation "[ ]".

This letter includes a copy of the proprietary version of the RAI response (Enclosure 2), a copy of the non-proprietary version of the RAI response (Enclosure 3), and the Affidavit of Yoshiki Ogata (Enclosure 1) which identifies the reasons MHI respectfully requests that all material designated as "Proprietary" in Enclosure 2 be withheld from 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.

Sincerely,

Y. Ogata

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

D081
NRO

Enclosures:

1. Affidavit of Yoshiki Ogata
2. MHI's Response to US-APWR DCD RAI No. 302-2327 Revision 2 (proprietary)
3. MHI's Response to US-APWR DCD RAI No. 302-2327 Revision 2 (non-proprietary)

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

Contact Information

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ENCLOSURE 1

Docket No. 52-021

MHI Ref: UAP-HF-09341

MITSUBISHI HEAVY INDUSTRIES, LTD.

AFFIDAVIT

I, Yoshiki Ogata, being duly sworn according to law, depose and 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 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 "MHI's Response to US-APWR DCD RAI No. 302-2327 Revision 2" dated July 3, 2009, and have determined that the document contains 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 basis for holding the referenced information confidential is that it describes the unique design of the safety analysis, developed by MHI (the "MHI Information").

4. The MHI Information is not used in the exact form by any of MHI's competitors. This information was developed at significant cost to MHI, since it required the performance of research and development and detailed design for its software and hardware extending over several years. Therefore public disclosure of the materials would adversely affect MHI's competitive position.

5. The referenced information has in the past been, and will continue to be, held in confidence by MHI and is always subject to suitable measures to protect it from unauthorized use or disclosure.

6. The referenced information is not available in public sources and could not be gathered readily from other publicly available information.

7. The referenced information is being furnished to the Nuclear Regulatory Commission ("NRC") in confidence and solely for the purpose of supporting the NRC staff's review of MHI's application for certification of its US-APWR Standard Plant Design.

8. Public disclosure of the referenced information would assist competitors of MHI in their design of new nuclear power plants without the costs or risks associated with the design and testing of new systems and components. Disclosure of the information identified as proprietary would therefore have negative impacts on the competitive position of MHI in the U.S. nuclear plant market.

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 3rd day of July, 2009.

Y. Ogata

Yoshiki Ogata

ENCLOSURE 3

UAP-HF-09341
Docket No. 52-021

MHI's Response to US-APWR DCD RAI No. 302-2327 Revision 2

July 2009

(Non-Proprietary)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/03/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 302-2327 REVISION 2**
SRP SECTION:	**15.01.05 – STEAM SYSTEM PIPING FAILURES INSIDE AND OUTSIDE OF CONTAINMENT (PWR)**
APPLICATION SECTION:	**15.1.5**
DATE OF RAI ISSUE:	**5/04/2009**

QUESTION NO.: 15.1.5-1

In DCD Section 15.1.5, the applicant presents the results of a set of Steam System Piping Failure events. Case B considers a double-ended break without offsite power; however, Table 15.1.5-1 indicates that the onset of RCP coast down is delayed until 4.5 seconds after the break. This appears to be the timing of the ECCS actuation as RCP trip coincides with ECCS actuation. What is the effect of this timing delay for LOOP on the analysis of this event? What is the basis for this assumed timing of LOOP (three seconds after reactor trip at 1.5 seconds)?

ANSWER:

As indicated in DCD Table 15.1.5-1, the low main steam line pressure analytical limit is reached at 1.5 seconds. There is a 3.0 second time delay prior to ECCS actuation on this signal, consistent with DCD Table 15.0-4. Therefore, the ECCS actuation occurs at 4.5 seconds. As described in DCD Subsection 15.1.5.3.3 for Case B (the case without offsite power), a reactor coolant pump trip occurs at 4.5 seconds from the RCP automatic trip on the ECCS actuation signal. In this analysis, the loss of offsite power is also assumed to occur at 4.5 seconds. Assuming the LOOP at the time of the ECCS actuation signal results in 4.5 additional seconds of full RCS flow and also delays the start of safety injection flow by 4.5 seconds, both of which are conservative. See also the response for Question 15.1-5 of RAI 301-2324.

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.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/03/2009

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QUESTION NO.: 15.1.5-2

The supporting methodology for steam system piping failures (DCD Section 15.1.5) states that MARVEL-M is used with point kinetics and that the code produces conservative results relative to space-dependent kinetics because of the reactivity weighting functions used. Provide proof that the point kinetics model will provide conservative results relative to using TWINKLE-M or equivalent.

ANSWER:

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.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/03/2009

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QUESTION NO.: 15.1.5-3

In DCD Section 15.1.5, the applicant presents results for three cases that were analyzed for Steam System Piping Failures. Cases A and B consider a double-ended break from hot standby with and without offsite power, respectively. The applicant indicated on Pg. 15.1-87 "the minimum DNBR in Case B is less limiting than the minimum DNBR in Case A," although the time of minimum DNBR is not presented. Since in both Case A and Case B the reactor is tripped on the same low main steam line pressure signal, it was expected that the minimum DNBR would be the same in both cases. Is this difference because the transient is from hot standby rather than from power? Please provide the reason(s) for this difference.

ANSWER:

Case A (the case with offsite power) conservatively assumes that the reactor coolant pumps (RCPs) do not trip during the transient. Due to the higher flow rate with the RCPs running, the cooldown is more severe, which causes a larger return to power and a higher maximum core heat flux. This can be seen by comparing the core heat flux for Case A shown in DCD Figure 15.1.5-3 to that of Case B in DCD Figure 15.1.5-15. The larger core heat flux for Case A results in a more limiting DNBR for Case A. The plots of DNBR versus time for Cases A and B are shown in the response to Question 15.1.5-4 of this RAI and indicate that Case A is more limiting than Case B.

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.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

7/03/2009

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QUESTION NO.: 15.1.5-4

Provide plots of DNBR verses time for Cases A and B in DCD Section 15.1.5.

ANSWER:

The plots of DNBR versus time for the analyses of Cases A and B in DCD Subsection 15.1.5 are shown below in Figures 15.1.5-4.1 and 15.1.5-4.2, respectively. These results are based on the steady state evaluation described in the Non-LOCA Methodology Topical Report (MUAP-07010), Section 5.4, "Method of Analysis", (b) DNBR calculation.

Figure 15.1.5-4.1 **DNBR versus Time**
Steam System Piping Failure
- Case A: Double Ended Break from Hot Standby with Offsite Power

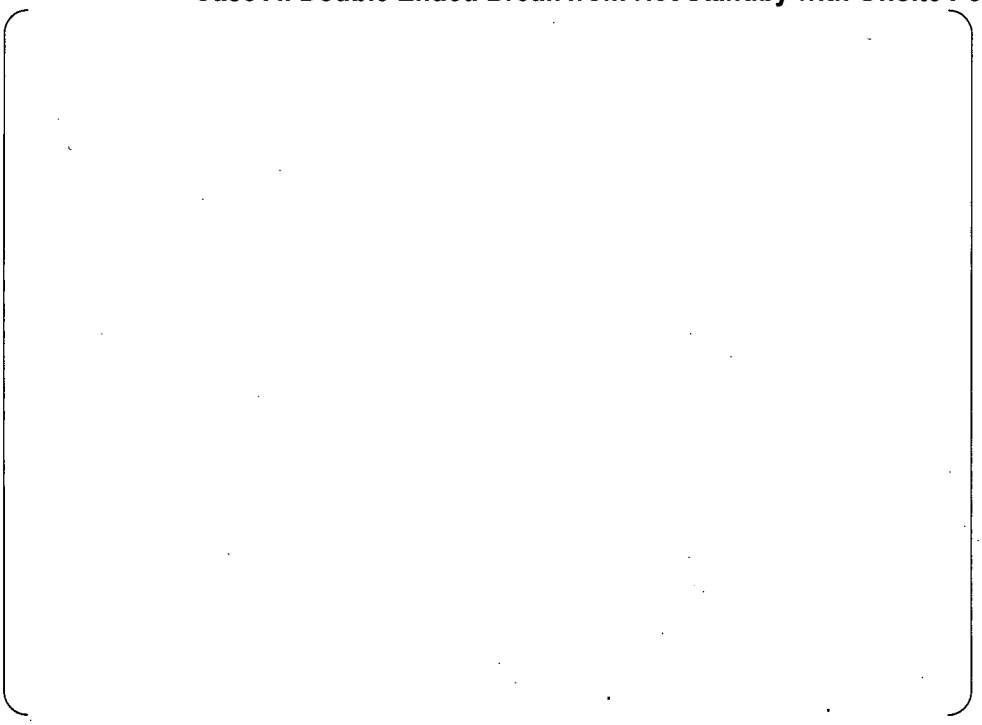

Figure 15.1.5-4.2 **DNBR versus Time**
Steam System Piping Failure
- Case B: Double Ended Break from Hot Standby without Offsite Power

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.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

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APPLICATION SECTION:	**15.1.5**
DATE OF RAI ISSUE:	**5/04/2009**

QUESTION NO.: 15.1.5-5

Question is a duplicate and was deleted.

ANSWER:

NA

Impact on DCD

NA

Impact on COLA

NA

Impact on PRA

NA