MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

March 31, 2010

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

Attention: Mr. Jeffery A. Ciocco

Docket No. 52-021
MHI Ref: UAP-HF-10090

Subject: **MHI's Amended Response to NRC RAI on Topical Report "Thermal Design Methodology" MUAP-07009 Revision 0**

References: 1) "Request for Additional Information Topical Report Thermal Design Methodology MUAP-07009 Rev. 0", dated August 20, 2009.
2) "Response to the NRC Request for Additional Information on Thermal Design Methodology MUAP-07009 Rev. 0", UAP-HF-09500, dated October 30, 2009

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "MHI's Amended Response to NRC RAI on Topical Report "Thermal Design Methodology" MUAP-07009 Revision 0." In this amendment, MHI provides NRC with further justification of the VIPRE-01 code version, which has previously been addressed in Reference 2 as a response to Reference 1.

Enclosed is the amended response to the question No. 1.5. MHI replaces the previous letter (Reference 2) with this amended response letter.

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 the submittals. His contact information is below.

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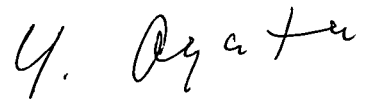
NRO

Sincerely,



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

Enclosures:

1. Affidavit of Yoshiki Ogata

2. MHI's Amended Response to NRC RAI on Topical Report "Thermal Design Methodology" MUAP-07009 Revision 0 (proprietary version)

3. MHI's Amended Response to NRC RAI on Topical Report "Thermal Design Methodology" MUAP-07009 Revision 0 (non-proprietary version)

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

Contact Information
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Enclosure 1

Docket No. 52-021
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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 "MHI's Amended Response to NRC RAI on Topical Report "Thermal Design Methodology" MUAP-07009 Revision 0," dated March 2010 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 thermal and hydraulic design developed by MHI and not being used in the exact form by any 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.

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 the development of the thermal and hydraulic design. Providing public access to such information permits competitors to duplicate or mimic the methodology without incurring the associated costs.

B. Loss of competitive advantage of the US-APWR created by benefits of enhanced plant safety, and reduced operation and maintenance costs associated with the thermal and hydraulic design.

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 31st day of March, 2010.

Y. Ogata

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

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Enclosure 3

UAP-HF-10090, Rev.0
Docket No. 52-021

MHI's Amended Response to NRC RAI on Topical Report "Thermal Design Methodology" MUAP-07009 Revision 0

March 2010
(Non-Proprietary)

1.5 *Identify which MOD of VIPRE-01 was used to create VIPRE-01M and which revision of documentation was used. If something other than MOD-01 or MOD-02 were used (for example, MOD-2.1) MHI may need to provide additional justification because even a "small" change to the evaluation model can have unintended consequences on calculation results that were through to not be impacted by the changes.*

Response:

MHI's VIPRE-01M code was created from VIPRE-01 MOD-2.2.1, which was the latest code version released by Computer Simulation & Analysis, Inc. (CSA) when MHI obtained the computer program from the VIPRE User Group (VUG) in 2006. The documentation used was NP-2511-CCM-A Rev. 4.

After NRC issued Safety Evaluations for the Electric Power Research Institute (EPRI) VIPRE-01 versions MOD-1.0 and MOD-2.0, VIPRE-01 MOD-2.1 was released to EPRI's Electric Power Software Center (EPSC) by Battelle Pacific Northwest Laboratory for the VIPRE Maintenance Group (VMG). Due to the change of administration of the computer program, the future VIPRE-01 code improvement and distribution functions were transferred to CSA and the maintenance work were administered by the VUG after MOD 2.1 became available.

All along, EPRI, through the VMG and subsequently the VUG, has adopted a 10CFR50 Appendix B-compliant QA program for its VIPRE-01 code development and improvement work. After the approval of VIPRE-01 versions MOD-1.0 and MOD-2.0, the maintenance and release of new code versions continued to comply with the NRC requirements per the Quality Assurance (QA) procedures as described in the Safety Evaluation for VIPRE-01 MOD-1.0 (Reference 1.5-1).

MHI has audited the CSA's 10CFR50 Appendix B- and 10 CFR 21- compliant QA program and concluded that the QA program had been properly applied to their code development and improvement work. CSA's procedures require evaluations and justifications of any appreciable changes in calculation results associated with any modifications. The controlled copy of VIPRE-01M MOD 2.1 had been transferred from EPSC to CSA under their QA program (Reference 1.5-2).

In addition to editorial error corrections, VIPRE-01 MOD-2.2.1 incorporated some enhancements that were added to MOD-2.0 and subsequent versions. MHI adopted three of the enhancements that had not been reviewed by the NRC's. They were verified by MHI as follows:

- Model to read RETRAN-3D - generated boundary condition file

  This model was modified to enable the code to read the boundary condition file generated by MHI's MARVEL-M code. This feature has been verified internally and was included in the response to RAI 3.10.

- Flexible radial fuel nodalization

  This feature was used for the equal volume and the equal thickness nodalizations in Chapter 7 of MUAP-07009-P, and the verification result was described in the chapter.

Reference

1.5-1 "Safety Evaluation Report on EPRI NP-2511-CCM VIPRE-01," May 1986

1.5-2 Letter from EPSC to CSA, "Safety-Related Products Controlled Shipment Packing List/Receipt Acknowledgement," dated July 23, 2004 (Proprietary)