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August 31, 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-11286

Subject: **Transmittal of the Technical Report entitled "US-APWR Sump Strainer Performance" (MUAP-08001, Revision 5)**

References:
[1] Letter MHI Ref: UAP-HF-11103 from Y. Ogata (MHI) to U.S. NRC, "Closure Plan for Issues Associated with GSI-191 for the US-APWR" dated May 24, 2011.

[2] Letter MHI Ref. UAP-HF-11193 from Y. Ogata (MHI) to U.S. NRC, "Transmittal of the Technical Report entitled "US-APWR Sump Strainer Performance" (MUAP-08001, Revision 4)" dated June 29, 2011.

[3] Letter MHI Ref: UAP-HF-11280 from Y. Ogata (MHI) to U.S. NRC. "Amended MHI's revised response to US-APWR RAI No. 740-5719 Revision 2", dated August 31, 2011.

[4] Letter MHI Ref: UAP-HF-11285 from Y. Ogata (MHI) to U.S. NRC. "Transmittal of the Technical Report entitled "US-APWR Downstream Effects" MUAP-08013 Revision 2", dated August 30, 2011.

This letter formally transmits the revised technical report entitled "US-APWR Sump Strainer Performance" (MUAP-08001, Revision 5) from Mitsubishi Heavy Industries, Ltd. ("MHI") to the U.S. Nuclear Regulatory Commission ("NRC").

As proposed in the US-APWR GSI-191 Closure Plan (Reference [1]), MHI has submitted the technical report MUAP-08001 Revision 4 (Reference [2]) for the staff's advance review. MUAP-08001 Revision 4 has incorporated the revised design input information for the strainer head loss tests and the fiber only bypass tests which were implemented in June, 2011. This transmittal, MUAP-08001 Revision 5, is submitted during preparation of the strainer test results, post calculations, and RAI response listed below. The completion and submittal of these three items is the final information regarding the sump strainer performance evaluations as proposed:

1. The strainer test results

   The strainer head loss tests and fiber only bypass tests have been implemented and completed in June 2011. Test results and post test assessments have been incorporated.

2. The head losses and NPSH evaluation

   The design basis head losses have been defined and the NPSH calculation has been finalized. The air ingestion analyses associated with strainer performance and pump performance has been updated.

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3. RAI response

   The amended response to RAI 06.02.02-64 (Reference [3]) associated with the RWSP minimum water level calculation has been incorporated. The latest inventory of water volumes were needed to be updated for consistency between the report and the DCD.

As listed in the letter (Reference [1]), MHI has identified fifteen (15) RAIs which were "no longer applicable for the NRC review". In order to close them, the following information has been incorporated into the MUAP-08001 Revision 5 and MUAP-08013 Revision 2 (Reference [3]):

1. RAI 06.02.02-18

   MHI justification for "bounding evaluation" compared with U.S. operating plant strainer head loss test result was no longer applicable for staff review because it has been abandoned by MHI. No action was needed by MHI.

2. RAI 06.02.02-21, -22, -23

   MHI justifications for design basis of debris size(s) in terms of debris transport and head loss have already been incorporated into the MUAP-08001 Revision 4, and partly updated to add clarifications in Revision 5. Please review details in the Section "3.1 Break Selection", "3.2 Debris Generation", "3.3 Debris Characteristics", and "3.4 Debris Transport".

3. RAI 06.02.02-28,-29,-30

   Updated air ingestion analyses regarding sump strainer performance and pump performance has been incorporated into the MUAP-08001 Revision 5. The terminologies used in R.G 1.84 Rev. 4 draft have been referred and used in the report. Please review details in the Section "3.5 Debris Head Loss and Vortexing" and "3.6.2.3 Effects of Air Ingestion on NPSH".

4. RAI 06.02.02-52

   The essential information with regard to the US-APWR strainer tests has been presented and discussed with the staff at the public meeting on May 25, 2011. MHI response to NRC question associated with MHI former test plan using Large Flume Test Protocol is no longer applicable for staff review. Instead, the mixing tank test protocol has been applied. The final test plan has been incorporated into the MUAP-08001 Revision4, and the tests results have been incorporated into the Revision 5. Please review details in Appendix-B, "Sump Strainer Head Loss and Fiber Only Bypass Tests".

5. RAI 06.02.02-53

   The final information associated with debris allocation per sump has been incorporated into the MUAP-08001 Revision 5. Please review details in the Section "3.4 Debris Transport".

6. RAI 04.04-36(d)

   MHI has been conducting the core inlet blockage tests to close this RAI. The conclusive summary has been incorporated into the MUAP-08013 Revision 2 "Downstream Effects" (Reference [4]). The confirmatory test report will be submitted to support the conclusion by October 7, 2011.

7. RAI 04.04-37(a)

   The fiber only bypass tests have been implemented to support the design basis bypass debris used in the downstream evaluations. The test plan and test results have been discussed in the MUAP-08001 Revision 5 Appendix-B "Sump Strainer Head Loss and Fiber Only Bypass Tests". The assessment of the design basis bypass fiber debris utilizing the test results has been discussed in the MUAP-08013 Revision 2 Appendix-J, "Fibrous Debris Sump Strainer Bypass Amount" (Reference [4]).

8. RAI 06.02.02-58, and -60

   NRC questions were associated with observations during the previous head loss test performed in June 2010. MHI has completed re-test in June 2011, addressing the floating debris issue and air ingestion in sensing lines. Please review the test observations reported in the MUAP-08001 Appendix-B, "Sump Strainer Head Loss and Fiber Only Bypass Tests".

9. RAI 06.02.02-61-Question No.4 and 5

   MHI has implemented multiple tests for the strainer tests to address the test repeatability which has been requested by Questioned No.4. Please review details in the MUAP-08001 Revision 5, Appendix-B, "Sump Strainer Head Loss and Fiber Only Bypass Tests". The final information of debris information used for the tests requested by Question No.5 has been incorporated into the MUAP-08001 Revision 5. Please review details in the Section "3.1 Break Selection", "3.2 Debris Generation", "3.3 Debris Characteristics", and "3.4 Debris Transport"

10. RAI 06.03-99

    MHI has implemented the fiber only bypass tests addressing floating debris issue. The tests utilized bag filter system to collect all fiber downstream the strainer, instead a grab sampling. The tests have been implemented addressing the floating debris issue. The final test plan and test results have been discussed in the MUAP-08001 Revision 5 Appendix-B. The design basis fiber bypass debris used for downstream evaluations has been discussed in MUAP-08013 Revision 2 Appendix-J. (Reference [4])

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 "[ ]".

Enclosed are 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.

Sincerely,

Y. Ogata

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

Enclosures:

1. Affidavit of Yoshiki Ogata

2. CD1: US-APWR Sump Strainer Performance (MUAP-08001-P Rev.5)
   - Version Containing Proprietary Information

3. CD2: "US-APWR Sump Strainer Performance (MUAP-08001-NP Rev.5)
   - Version **Not** Containing Proprietary Information

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

Contact Information
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Telephone: (412) 373 – 6466

ENCLOSURE 1

Docket No.52-021

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 " US-APWR Sump Strainer Performance" dated August 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 design of the chemical effects evaluation and the strainer head loss and bypass test procedure related to the US-APWR design, developed by MHI and sub-vendors not 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 test configuration, methodology and the test procedure. 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 safety and the plant specific strainer system 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 August, 2011.

Y. Ogata

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

ATTACHMENT 1

FILE CONTAINED IN CD 1

CD 1: "US-APWR Sump Strainer Performance (MUAP-08001-P)" – Version Containing Proprietary Information

Contents of CD

File Name	Size	Sensitivity Level
001 MUAP-08001-P(R5).pdf	53.9 MB	Proprietary

ATTACHMENT 2

FILE CONTAINED IN CD 2

CD 2: "US-APWR Sump Strainer Performance (MUAP-08001-NP)" – Version Not Containing Proprietary Information

Contents of CD

File Name	Size	Sensitivity Level
001 MUAP-08001-NP(R5).pdf	6.17 MB	Non-Proprietary