MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

February 17, 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-11039

Subject: **MHI's Response to US-APWR DCD RAI No. 680-5277 Revision 0 (SRP Section 07.01)**

Reference: 1) "Request for Additional Information No. 680-5277 Revision 0, SRP Section: 07.01 – Instrumentation and Controls – Introduction – Application Section: 07.01 – Instrumentation and Controls – Introduction" dated January 18, 2011.

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") a document entitled "Response to Request for Additional Information No. 680-5277 Revision 0."

Enclosed is the response to a question contained within Reference 1.

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.

Enclosure:

1. Response to Request for Additional Information No. 672-4982 Revision 2

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

Contact Information
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Enclosure 1

UAP-HF-11039
Docket No. 52-021

Response to Request for Additional Information No. 680-5277
Revision 0

February 2011

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

02/17/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 680-5277 REVISION 0**
SRP SECTION:	**07.01 - INSTRUMENTATION AND CONTROLS - INTRODUCTION**
APPLICATION SECTION:	**07.01 - INSTRUMENTATION AND CONTROLS - INTRODUCTION**
DATE OF RAI ISSUE:	**01/18/2011**

QUESTION NO. : 07.01-24

The NRC staff has completed an acceptance-like review of the SPMs, JEXU-1012-1132, Rev. 1 and MUAP-07017, Rev. 2 and has determined they do not provide the necessary level of detail, are incomplete, and do not adequately address the staff guidance directly associated with the software life cycle process. The safety system software should be developed to Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(a)1, "Codes and Standards," Section 50.55a(h), "Protection and Safety Systems" and 10 CFR Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants," General Design Criterion (GDC) 1, "Quality Standards and Records," which require safety related structures be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Also, in 10 CFR Part 50, Appendix B, Quality Assurance Criteria, criteria apply as they extend to the software elements.

As the significant lack of detail and specificity are the primary unacceptable elements of the SPMs preventing a detailed technical review, the staff provides some examples of the incompleteness of the processes and documentation described: 1. The SPMs do not identify several processes, and in other cases are not consistent with, software engineering processes used in the IEEE standards endorsed by the staff. A few examples are:

1. The SPMs do not identify several processes, and in other cases are not consistent with, software engineering processes used in the IEEE standards endorsed by the staff. *A few examples are:*
   a. All types of Quality Assurance (QA) audits
   b. The multiple sections of the Verification and Validation (V&V) plan
   c. The many topics to be addressed for each V&V activity

d. The types of software safety analyses to be completed for each phase of the software life cycle
e. A methodology for the identification of software metrics per the IEEE standard
f. The use of Configuration Control Boards

2. The SPMs do not recognize the proper development of, or are in many instances not consistent with, documentation in the IEEE standards endorsed by the staff. *A few examples are:*
   a. The types of required V&V reports
   b. The types of test documents to implement the three categories of test documentation
   c. The various classes of information in the Software Configuration Management Plan

3. The SPMs do not sufficiently identify the regulations, requirements and standards that form the basis for the plant safety analysis in the development plan or in the software requirements specifications. These should be as complete as known at the time and, if they are to be determined, a process per staff guidance, for changing, updating, tracking and identifying them as "To be Determined" should be developed.

4. Software Tools are not completely listed (examples: the engineering tool, RAPID and MELENs) nor the specific qualification, configuration controls or the organizational responsibilities for implementation.

5. Many terms and their definitions that are essential to describing the process or entities in the SPMs are missing or are not consistent with the standard for software engineering terminology identified by the staff in the endorsed regulatory guides.

6. As upper tier documents, SPMs should identify the relationship to and the actual software plans and procedures used to implement the software planning process. Outputs of the following lifecycle phases cannot be identified as "typical or "sample."

7. All relavent, consistent information on the lifecycle process should be in the SPMs and only the SPMs, not in other licensing documents.

8. Also procedures not usually specific to software but are necessary to support the software plans should be specifically identified such as: Quality & Technical manuals, Training Databases, Project Risk management, work authorizations, sub-supplier procurement controls, document handling and storage, etc. If these do not exist, the SPM should be detailed enough to identify the procedure, responsibilities and documents generated including format and content.

MHI is requested to revise accordingly and resubmit both SPMs.

ANSWER:

MHI submitted the revised SPMs, MUAP-07017, Rev. 3 and JEXU-1012-1132, Rev. 2, on January 31, 2011 (UAP-HF-11020). These SPMs have been revised to reflect feedback received from the NRC at the public meeting held on January 20, 2011 and NRC staff requests for improvement of both SPMs in the "US-APWR SPM Letter", dated December 22, 2010.

The SPMs were revised using the following process:

1. Analyze NRC comments from public meetings, letters, and RAIs
2. Reevaluate conformance to the guidance and standards documents listed below
3. Revise SPMs using terminology based on IEEE Std 610.

Compliance tables have been updated to demonstrate subsection compliance to the following guidance and standards (see Appendix B of both SPMs):

NUREG-0800	BTP 7-14
RG 1.152 Rev. 2	IEEE Std 7-4.3.2-2003
RG 1.153 Rev. 1	IEEE Std 603-1991
RG 1.169	IEEE Std 828-1990
RG 1.170	IEEE Std 829-1983
RG 1.172	IEEE Std 830-1993
RG 1.171	IEEE Std 1008-1987
RG 1.168 Rev. 1	IEEE Std 1012-1998
RG 1.168 Rev. 1	IEEE Std 1028-1997
RG 1.169	IEEE Std 1042-1987
RG 1.173	IEEE Std 1074-1995

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.

This completes MHI's responses to the NRC's question.