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TOKYO, JAPAN

April 15, 2010

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-10104

Subject: MHI's Response to US-APWR DCD RAI No. 554-4417 Revision 0

Reference: 1) "Request for Additional Information No. 554-4417 Revision 0, SRP Section: 14.02 – Initial Plant Test Program – Design Certification and New License Applicants, Application Section: 14.2 Initial Plant Test Program" dated April 15, 2010.

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. 554-4417 Revision 0."

Enclosed is the response to Question 14.02-121 that is 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. 554-4417 Revision 0

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

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Docket No. 52-021
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Enclosure 1

UAP-HF-10104
Docket No. 52-021

Responses to Request for Additional Information No. 554-4417
Revision 0

April 2010

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

04/15/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 554-4417 REVISION 0**
SRP SECTION:	**14.02- INITIAL PLANT TEST PROGRAM**
APPLICATION SECTION:	**14.2**
DATE OF RAI ISSUE:	**4/15/2010**

QUESTION NO.: 14.02-121

Followup to RAI 14.02-115 (2398/9963)

Section 14.2.12.1.87 of the US-APWR DCD does not adequately document testing of the components listed below:

- Testing of the system cross-connect valves to close within 10 seconds and verification that a water hammer event does not occur

Please revise Section 14.2.12.1.87 accordingly.
(Technical Branch Chapter 9 Review)

ANSWER:
MHI concurs with the NRC's recommendation. Subsection 14.2.12.1.87 has been expanded to specify the testing of the cross-connect valve closure time. The closure time has been corrected to "within 30 seconds" with the expansion of the test abstract.

On the other hand, NUREG-0927 "Evaluation of Water Hammer Occurrence in Nuclear Power Plants" defines water hammer as "the change in the pressure of a fluid in a closed conduit caused by a rapid change in the fluid velocity". The 30-second closure time of the cross-connect valves ensures to lessen the probability of water hammer occurrence. For this reason, the verification test regarding water hammer is considered to be unnecessary in Section 14.2.12.1.87.

Impact on DCD

Subsection 14.2.12.1.87, Component Cooling Water System Preoperational Test, has been revised as follows:

A. Objectives
   1. To verify the operation, interlock and alarm of CCW surge tank.
   2. To demonstrate the capability of the CCW system to provide cooling water during normal

operation, normal cooldown, and postulated loss-of-coolant accident (LOCA) modes of operation.

3. To verify operation of system valves and control circuitry.
4. To demonstrate the operation and verify the operating characteristics of the CCW pumps.

B. Prerequisites

1. Required construction testing is completed.
2. Component testing and instrument calibration is completed.
3. Test instrumentation is available and calibrated.
4. Required support systems are available.
5. Demineralized water is available for system makeup.
6. The CCW is aligned to cool the CCW motors.
7. The ESWS is available to CCW heat exchangers.

C. Test Method

1. The control circuitry of the CCW pumps, surge tanks, and valves is verified.
2. The CCW system pumps are operated, and performance characteristics verified.
3. System flows are balanced, as required, and then verified in each mode of operation. Testing includes verification of coolant flow to the thermal barrier via cross-tie.
4. The cooling ability of the CCW system is verified during RCS heatup and cooldown in conjunction with the RHRS during the hot functional test.
5. CCW surge tank vent valve closure logic is verified using a simulated high CCW radiation monitor condition.
6. The thermal barrier heat exchanger cooling water return line isolation valve logic is verified using a simulated reactor coolant pump thermal barrier heat exchanger cooling water high flow condition.
7. The CCW header tie line isolation valves' closure logic is verified to be consistent with Subsection 9.2.2.2.1.5 using simulated signals. Valve response to ESF actuation signals may be verified via other tests (e.g., Subsection 14.2.12.1.55, ECCS Actuation and Containment Isolation Logic Preoperational Test).
8. The CCW header tie line isolation valves' closure time is verified to be consistent with Subsection 9.2.2.2.1.5.
9. Demonstrate the ability to provide makeup water and verify flow to each pressurized CCW surge tank using DWS, PMWS and RWS supplies.

D. Acceptance Criteria

1. The tank alarms and interlocks operate as designed.
2. The performance characteristics of the CCW pumps are within design specifications (Subsection 9.2.2)
3. Components that are supplied with CCW receive flows that are within the design specifications in each of the operating modes including the supply of coolant flow to the thermal barrier via cross-tie.
4. The pump control and interlocks operate as designed.
5. CCW system performance characteristics are within design specifications.
6. CCW surge tank vent valve high radiation logic operates as described in Subsection 9.2.2.5.2.
7. The thermal barrier heat exchanger cooling water return line isolation valve logic operates as described in Subsection 9.2.2.5.5.
8. The CCW header tie line isolation valves' closure logic and closure time are consistent with Subsection 9.2.2.2.1.5.
9. The ability to provide makeup water to each pressurized CCW surge tank using DWS,

PMWS and RWS supplies is demonstrated.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.