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TOKYO, JAPAN

August 23, 2011

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-11269

Subject: MHI's Responses to US-APWR DCD RAI No. 763-5814 REVISION 3, (SRP 09.01.03)

Reference: 1) "REQUEST FOR ADDITIONAL INFORMATION 763-5814 REVISION 3, SRP Section: 09.01.03 - Spent Fuel Pool Cooling and Cleanup System, Application Section: 8.3 and 9.1.3" dated 5/31/2011.

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. 763-5814 REVISION 3".

Enclosed are the responses to one RAI contained within Reference 1. This transmittal completes the response to this RAI.

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.

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NRO

Enclosure:

1. Response to Request for Additional Information No. 763-5814 REVISION 3.

CC: J. A. Ciocco
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Enclosure 1

UAP-HF-11269
Docket No. 52-021

Response to Request for Additional Information No. 763-5814,
Revision 3

August, 2011

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

8/23/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No.52-021

RAI NO.:	**NO. SPBA 763-5814 REVISION 3**
SRP SECTION:	**09.01.03 – Spent Fuel Pool Cooling and Cleanup System**
APPLICATION SECTION:	**8.3.1 AND 9.1.3**
DATE OF RAI ISSUE:	**5/31/2011**

QUESTION NO.: 09.01.03-9

QUESTIONS for Balance of Plant Branch 1 (SBPA)
09.01.03-
DCD Tier 2 Section 8.3.1.1.3.6 discusses the load shedding and sequencing circuits for the Class 1E 6.9kV buses. This DCD section states that should a loss of coolant accident (LOCA) occur, concurrently with a loss of offsite power (LOOP), the emergency core cooling system (ECCS) actuation signal initiates the ECCS load sequence. Loads that are not required by the ECCS (except the main control room loads) are shed. Since the spent fuel pool cooling system (SFPCS) is not needed to support emergency core cooling, it would be shutdown in this scenario.
General Design Criteria (GDC) 63, "Monitoring fuel and waste storage," requires that appropriate systems be provided in the fuel storage area to detect conditions that may result in the loss of residual heat removal capability or excessive radiation levels, and initiate appropriate safety actions.
DCD Tier 2 Section 9.1.3, "Spent Fuel Pit Cooling and Purification System," describes the operation of the safety related SFPCS. It appears that the system description provided in Section 9.1.3 is not consistent with the scenario discussed in DCD Tier 2 Section 8.3.1.1.3.6.
In order to verify compliance with GDC 63, the staff requests the applicant to revise DCD Tier 2 Section 9.1.3 to discuss:

a) any automatic actuation signal that would shutdown the SFPCS,

b) justify why there is no automatic loading of the SFPCS,

c) how are the spent fuel pool conditions (i.e. level, temperature, etc.) monitored, and with what instrumentation, while the SFPCS is not in operation, and

d) any operator actions needed to re-establish the SFPCS and the time frame that these actions are required to take place.

ANSWER:

Refer to the following answers for each item of RAI Question No.09.01.03-9

a) The SFP pumps will trip on an undervoltage signal, as shown on DCD Figure 8.3.1-2 (sheet 24 of 24), or the SFP low-low water level setpoint. Refer to UAP-HF-11255, MHI's Response to US-APWR DCD RAI No. 756-5753 Revision 3 (SRP 09.01.03).

b) At an occurrence of LOOP, the SFP pump will trip on undervoltage, as shown on DCD Figure 8.3.1-2 (sheet 24 of 24). The pump will not be automatically re-actuated by the sequencer. However, the pump can be manually started from the MCR to re-establish the SFP cooling, if the GTG has available margin following the automatic load sequencer, as noted on DCD Table 8.3.1-4. Without SFP cooling, the minimum time until the SFP temperature reaches 200 deg F is approximately 2.5 hours, which is the SFP time-to-boil evaluated at the most critical condition. Therefore, the operator will have temperature indication/alarm available in control room to determine if operator action should be taken to manually restore pump operation prior to exceeding the 200 °F limit.

c) The SFP has two safety-related water level gauges and two safety-related temperature elements to monitor the status of the SFP. Two flow meters, one for each SFPCS train, can provide the operating condition of SFP cooling system. Those instruments are classified as Class 1E, which are powered by the Class 1E load center. The details of these instruments will be described in Section 9.1.3.5 per the response to RAI 756-5368.

d) At an occurrence of LOOP, the SFP pump will trip on undervoltage. Operators will monitor SFP temperature and water level and re-establish SFP cooling flow before the SFP temperature reaches the 200 degF design temperature. Without SFP cooling, the minimum time until the SFP temperature reaches 200 degF is approximately 2.5 hours, which is the SFP time-to-boil evaluated at the most critical condition. Before re-establishing SFP cooling, the operator should confirm that the SFP level is above the low-low level alarm setpoint. Since SFP cooling will be re-established before boiling, the water level in the SFP will not be significantly reduced due to evaporation. If the water level is below the low-low setpoint, the local operation to recover SFP water level will be necessary. The recovery operation will be done with the confirmation of SFP water temperature and water level locally. Indication of coolant flow to the heat exchanger will confirm that the cooling function has been re-established. This coolant flow can be monitored from MCR or local.

Impact on DCD
See UAP-HF-11255, MHI's Response to US-APWR DCD RAI No. 756-5753 Revision 3 (SRP 09.01.03), Attachment 1 US-APWR DCD Section 9.1.3 Mark-up. Changes to be incorporated for this response are same as that of the response to RAI No. 756-5753.

Impact on R-COLA
There is no impact on the R-COLA.

Impact on S-COLA
There is no impact on the S-COLA.

Impact on PRA
There is no impact on the PRA.