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TOKYO, JAPAN

September 5, 2012

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-12253

Subject: MHI's Responses to the Questions at the US-APWR ACRS Subcommittee Meeting on March 22-23, 2012 Regarding DCD Chapter 9

Reference: [1] "Official Transcript of the ACRS US-APWR Subcommittee Meeting, March 22-23", dated March 23, 2012 [ML120950597].

With this letter, Mitsubishi Heavy Industries, Ltd. ("MHI") transmits to the U.S. Nuclear Regulatory Commission ("NRC") the document entitled "Responses to the Questions at the US-APWR ACRS Subcommittee Meeting on March 22-23, 2012 Regarding DCD Chapter 9".

Enclosed are the responses to questions that were discussed during the US-APWR ACRS Subcommittee meeting on March 22-23, 2012 regarding DCD Chapter 9. This submittal completes the action items committed to by MHI during the discussions documented in Reference 1.

Please contact Mr. Joseph Tapia, General Manager of Licensing Department, Mitsubishi Nuclear Energy Systems, Inc., if the NRC has questions concerning any aspect of this submittal. His contact information is provided below.

Sincerely,

Yoshiki Ogata
Director - APWR Promoting Department
Mitsubishi Heavy Industries, Ltd.

Enclosure:

1. Responses to the Questions at the US-APWR ACRS Subcommittee Meeting on March 22-23, 2012 Regarding DCD Chapter 9

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NRO

CC: J. A. Ciocco
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ENCLOSURE 1

UAP-HF-12253
Docket No. 52-021

Responses to the Questions at the US-APWR ACRS Subcommittee Meeting on March 22-23, 2012 Regarding DCD Chapter 9

September 2012

RESPONSE FOR ACRS SUBCOMMITTEE MEETING

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 9

CHAPTER TITLE: AUXILIARY SYSTEMS

DATE OF MEETING: 3/22/12

QUESTION: Item 1

Suppose that the SFP water level is at the height of the weir wall. How long does it take to reach boiling? And how long does it take to reach fuel damage?

ANSWER:

As discussed during the ACRS meeting, although the reduction of SFP water level to the height of the weir wall is not postulated for a design basis condition, nor has such a scenario been indicated as risk significant, the time to reach boiling if SFP cooling were lost, starting from the reduced SFP water level, can be calculated. Note that steam cooling may prevent fuel damage for some period after fuel uncovery; however, it is conservatively assumed that fuel damage occurs at the time of fuel uncovery.

There are 20953 ft^3 of gross water volume below the top of the weir wall (excluding the volumes of the fuel assemblies and fuel racks) and 991 ft^3 of water volume above the level of the top of the fuel. Assuming the initial SFP temperature is the maximum design basis temperature of 140°F (DCD Rev. 3, Section 9.1.3.1), the times to reach boiling when the SFP contains a half core offload and a full core offload are calculated to be 3.1 hours and 0.9 hours, respectively.

Once boiling begins, the evaporation rate of the SFP water is 424 ft^3/h for a half core offload and 1413 ft^3/h for a full core offload. Thus, the top of the fuel would be uncovered at 2.3 hours after the SFP starts boiling for a half core offload and 0.7 hours after the SFP starts boiling for a full core offload. As stated previously, the time to fuel uncovery is conservatively assumed to be the time of fuel damage.

The boiling times and fuel uncovery times for a loss of SFP cooling starting when the SFP water level is at the height of the weir wall are summarized in Table-1.

Table-1 Summary of Times to Reach Boiling and Fuel Uncovery Assuming Initial Water Level at Top of Weir Wall

	Boiling Time	Fuel Uncovery Time
Half core offload	3.1 hr	5.4 hr (2.3 hr after boiling starts)
Full core offload	0.9 hr	1.6 hr (0.7 hr after boiling starts)

Impact on DCD
There is no impact on the DCD.

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.

RESPONSE FOR ACRS SUBCOMMITTEE MEETING

US-APWR Design Control Document

Mitsubishi Heavy Industries, Ltd.

CHAPTER: 9

CHAPTER TITLE: AUXILIARY SYSTEMS

DATE OF MEETING: 3/22/12

QUESTION: Item 2

Regarding the RWSP cleanup line, how is the line isolated from the non-safety purification loop in the event the purification loop of SFPCS is ruptured? Consider that the isolation valves installed in the SFP cleanup lines (SFS-MOV-001A,B-S, SFS-MOV-002A,B-S) are now automatic isolation valves, but cannot isolate the RWSP, and the isolation valves installed in the RWSP cleanup lines are still manual valves.

In addition, if the operators had to go in and locally isolate RWSP from this cleanup subsystem because of leakage of this subsystem, are those valves physically located in the room with the demineralizers, or are they outside of that room? In other words, are they accessible, and could they be affected by flow?

ANSWER:

As discussed during the ACRS meeting, the isolation valves between the RWSP and the purification portion of the SFPCS (SFS-VLV-103A,B-S) are manual valves and operator action is required to close these valves. These valves are located in an area where operation could be affected by postulated SFP demineralizer leakage. However, an operator is not required to use these valves to isolate the RWSP. As shown in Figure 1, closing the containment isolation valves installed downstream of the RWSP (RWS-MOV-002-S, RWS-MOV-003-S, and RWS-AOV-022S) will isolate the RWSP from the purification portion of the SFPCS; these valves can be operated remotely from the MCR. These valves are located in the reactor building (R/B), i.e. physically separated from the SFP demineralizer rooms which are in the auxiliary building (A/B); thus, operation of these valves would not be affected by SFP demineralizer leakage.

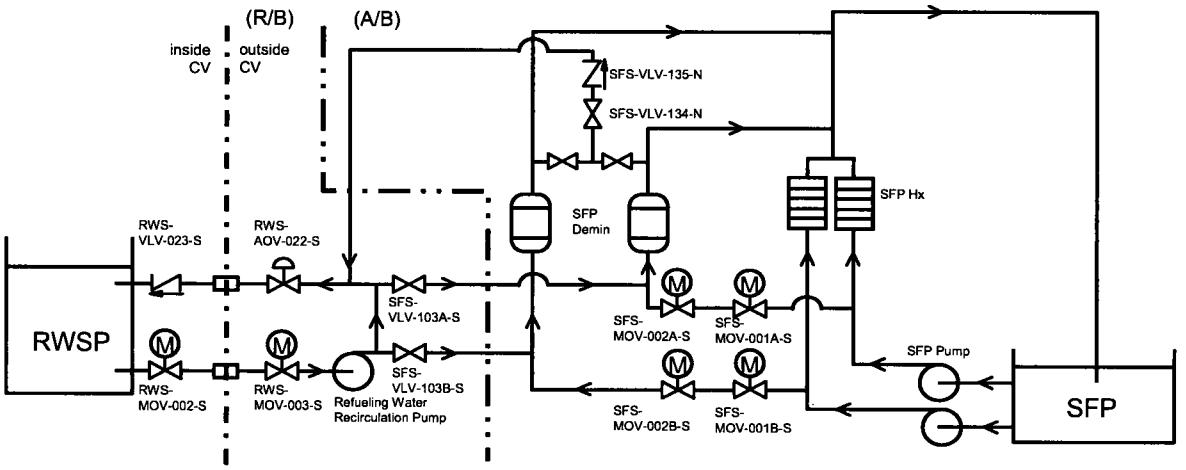

Figure 1: Isolation Valves for SFPCS Purification Loop

Impact on DCD
There is no impact on the DCD.

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.