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TOKYO, JAPAN

February 8, 2013

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-13014

Subject: MHI's Response to US-APWR DCD RAI No. 982-6036 (SRP 06.03)

Reference: 1) "Request for Additional Information No. 982-6036, SRP Section 06.03 – Emergency Core Cooling System - Application Section: 6.3", dated December 18, 2012.

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. 982-6036."

Enclosed is the response to the question contained within 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,

Y. Ogata

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

Enclosure:

1. Response to Request for Additional Information No. 982-6036

D081
NRO

CC: J. A. Ciocco
J. Tapia

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Docket No. 52-021
MHI Ref: UAP-HF-13014

Enclosure 1

UAP-HF-13014
Docket No. 52-021

Response to Request for Additional Information No. 982-6036

February 2013

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

2/8/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI No.:	**982-6036**
SRP Section:	**06.03 – Emergency Core Cooling System**
Application Section:	**06.03**
DATE of RAI issue:	**12/18/2012**

QUESTION NO.: 06.03-111

In a July 27, 2009, response to RAI 391-2974 Question 06.03-17 (RAI 6.3.2.1-2), MHI stated the hydrodynamic loads evaluation for the emergency letdown system spargers in the RWSP has not yet been completed. The applicant stated that it does not expect the hydrodynamic loads to be a problem because the reactor coolant discharged from the sparger during emergency letdown is small. The staff is currently unable to confirm that the sparger design is adequate. Therefore, the staff request that the applicant demonstrate that the sparger design is adequate using a hydrodynamic loads evaluation.

ANSWER:

The hydrodynamic load evaluation will be dependent on final system layout and piping arrangement to be determined during detailed design. Therefore, MHI will perform the hydrodynamic load evaluation as part the US-APWR detailed design and verified as part of existing ITAAC.

The existing ITAAC for ECCS functional arrangement (DCD Tier 1, Table 2.4.4-5, 1.a) and ASME Code Section III piping design (DCD Tier 1, Table 2.4.4-5, 2.b) are sufficient to verify the final hydrodynamic load evaluation for the emergency letdown system spargers.

DCD Tier 1 Table 2.4.4-1, Table 2.4.4-2, Table 2.4.4-3, and Figure 2.4.4-1, and DCD Tier 2 Chapter 3, Table 3.2-2 are revised as shown in the attached mark-ups to clarify that the emergency letdown system spargers are within the scope of the existing ITAAC.

Impact on DCD

DCD Tier 1 Table 2.4.4-1, Table 2.4.4-2, Table 2.4.4-3, Figure 2.4.4-1, and DCD Tier 2 Chapter 3, Table 3.2-2 are revised as shown in the attached mark-ups.

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.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.

Table 2.4.4-1 Emergency Core Cooling System Location of Equipment and Piping

System and Components	Location	
ECC/CS Suction Strainers	Containment	
Safety injection pumps	Reactor Building	
Accumulators	Containment	
Refueling Water Storage Pit	Containment	
NaTB Baskets	Containment	
NaTB Basket Containers	Containment	
Safety injection piping and valves between the direct vessel injection penetration and including the check valves SIS-VLV-012 A, B, C, D upstream of the direct vessel injection penetration	Containment	MIC-03-T1-0 0009
Safety injection piping and valves upstream of and excluding the check valves SIS-VLV-012A,B,C,D upstream of the direct vessel injection penetration	Containment and Reactor Building	MIC-03-T1-0 0009
Hot leg injection piping downstream of and including the motor operated valves SIS-MOV-014 A ,B, C, D	Containment	
Hot leg injection piping upstream of but excluding the motor operated valves SIS-MOV-014 A, B, C, D	Containment	
Accumulator piping and valves on the RCS side of and including the check valves SIS-VLV-102 A, B, C, D	Containment	
Accumulator piping and valves on the accumulator side of but excluding the check valves SIS-VLV-102 A, B, C, D	Containment	
Emergency letdown isolation valves SIS-MOV-031A, 031D, 032A, 032D and piping between valves	Containment	
Emergency letdown piping from the isolation valves to the RWSP spargers	Containment	DCD_06.03-111
Accumulator nitrogen vent piping up and including valves SIS-VLV-114, SIS-MOV-121A,B	Containment and Reactor Building	
NaTB solution transfer piping	Containment	
~~RWSP transfer piping~~	~~Containment~~	MIC-03-T1-0 0006
Refueling cavity drain piping	Containment	
Debris interceptors	Containment	MIC-03-T1-0 0006
Reactor cavity overflow piping to the RWSP	Containment	
Header compartment overflow piping to the RWSP	Containment	
RWSP overflow piping to C/V drain pump room	Containment	

Table 2.4.4-2 Emergency Core Cooling System Equipment Characteristics (Sheet 4 of 4)

Equipment Name	Tag No.	ASME Code Section III Class	Seismic Category I	Remotely Operated Valve	Class 1E/ Qual. For Harsh Envir.	PSMS Control	Active Safety Function	Loss of Motive Power Position	
Safety Injection Pump Discharge Check Valves	SIS-VLV-004 A,B,C,D	2	Yes	No	-/—	—	Transfer Open	—	DCD_14.03-13
Safety Injection Pump Minimum Flow	SIS-FT-072, 073, 074, 075	—	Yes	—	Yes/Yes~~No~~	—	—	—	
Accumulator Water Level	SIS-LT-010, 020, 030,040	—	Yes	—	Yes/Yes	—	—	—	
Accumulator Pressure	SIS-PT-010, 020, 030, 040	—	Yes	—	Yes/Yes	—	—	—	
Safety Injection Pump Suction Pressure	SIS-PT-060, 061, 062, 063	—	Yes	—	Yes/No	—	—	—	
Safety Injection Pump Discharge Pressure	SIS-PT-064, 065, 066, 067	—	Yes	—	Yes/No	—	—	—	
Refueling Water Storage Pit Water Level	RWS-LT-010, 011, 012, 013	—	Yes	—	Yes/Yes	—	—	—	
Safety Injection Pump Discharge Flow	SIS-FT-062, 063, 064, 065	—	Yes	—	Yes/No	—	—	—	
Debris Interceptors	SIS-SST-001-A, B, C, D, E, F, G	=	Yes	=	-/—	=	=	=	MIC-03-T1-00006
RWSP Overflow Pipe Check Valves	RWS-VLV-078, 079	2	Yes	=	-/—	=	=	=	DCD_14.03-13
RWSP Sparger Nozzle	RWS-SNZ-001A, B	2	Yes	=	-/-	=	=	=	DCD_06.03-111

NOTE:
Dash (-) indicates not applicable

Table 2.4.4-3 Emergency Core Cooling System Piping Characteristics

Pipe Line Name	ASME Code Section III Class	Leak Before Break[1]	Seismic Category I	
SI piping and valves between the DVI penetration and including the check valves SIS-VLV-012 A, B, C, D upstream of the DVI penetration	1	No	Yes	DCD_14.03-9 MIC-03-T1-00009
SI piping and valves upstream of and excluding the check valves SIS-VLV-012 A, B, C, D upstream of the DVI penetration	2	No	Yes	MIC-03-T1-00009
Hot leg injection piping downstream of and including the 4 motor operated valves SIS-MOV-014 A, B, C, D	1	No	Yes	
Hot leg injection piping upstream of but excluding the 4 motor operated valves SIS-MOV-014 A, B, C, D	2	No	Yes	
Accumulator piping and valves on the RCS side of and including the check valves SIS-VLV-102 A, B, C, D	1	Yes	Yes	
Accumulator piping and valves on the accumulator side of but excluding the check valves SIS-VLV-102 A, B, C, D	2	No	Yes	
Emergency letdown isolation valves SIS-MOV-031A, 031D, 032A, 032D and piping between valves	1	No	Yes	
Emergency letdown piping downstream of but excluding the isolation valves SIS-MOV-031A, 031D, 032A, and 032D	2	No	Yes	DCD_06.03-111
Accumulator nitrogen vent piping up and including valves SIS-AOV-114, SIS-MOV-121A,B	2	No	Yes	
NaTB solution transfer piping	2	No	Yes	
~~RWSP transfer piping~~	~~2~~	~~No~~	~~Yes~~	MIC-03-T1-00006
Refueling cavity drain piping	2	No	Yes	
Reactor cavity overflow piping to the RWSP	2	No	Yes	MIC-03-T1-00006
Header compartment overflow piping to the RWSP	2	No	Yes	
RWSP overflow piping to C/V drain pump room	2	No	Yes	

Note:
1. A "Yes" in the Leak Before Break column indicates that the pipe is a candidate for LBB evaluation.

DCD_14.03-9

DCD_06.03-111

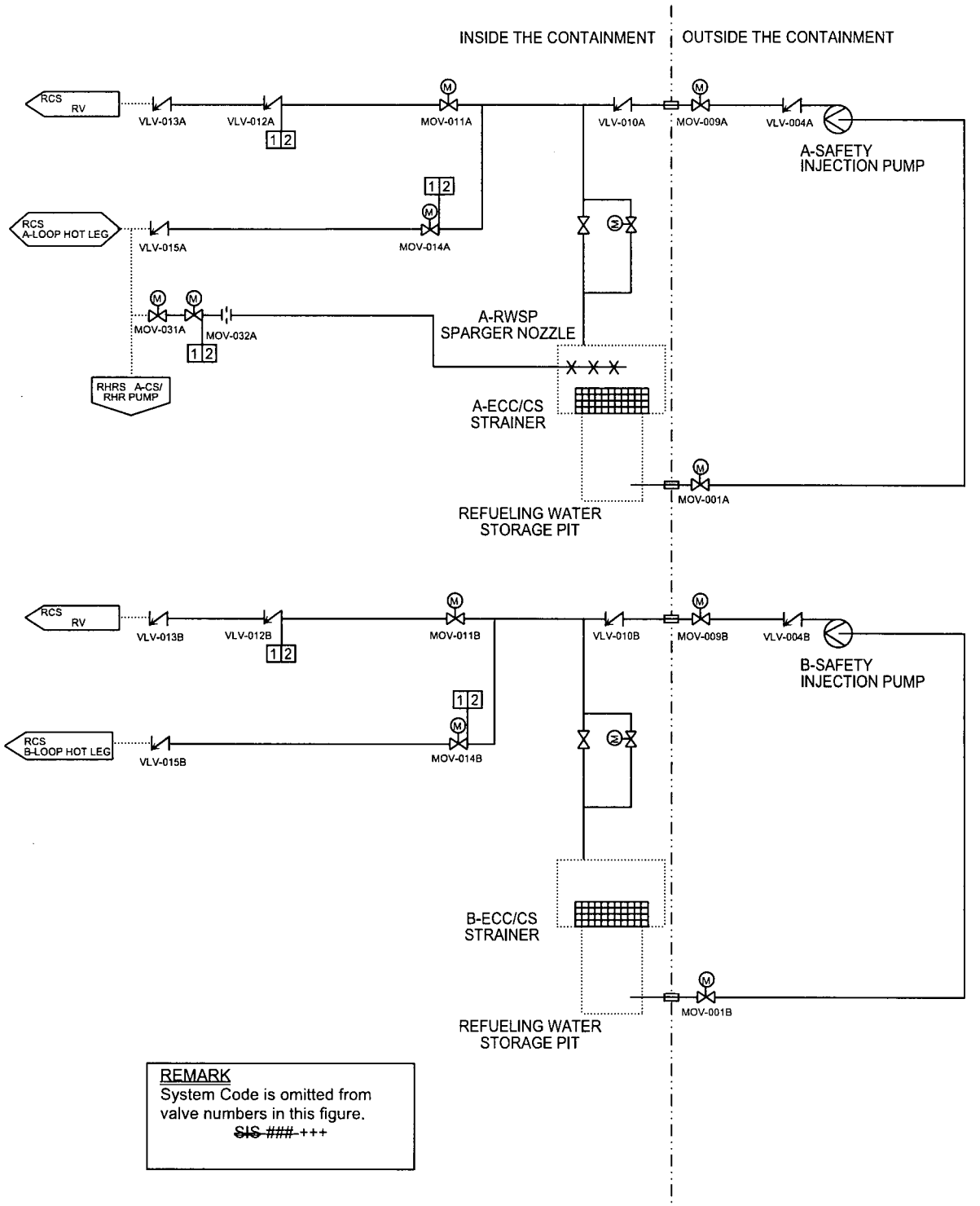

Figure 2.4.4-1 Emergency Core Cooling System (Sheet 1 of 4)

DCD_06.03-
111

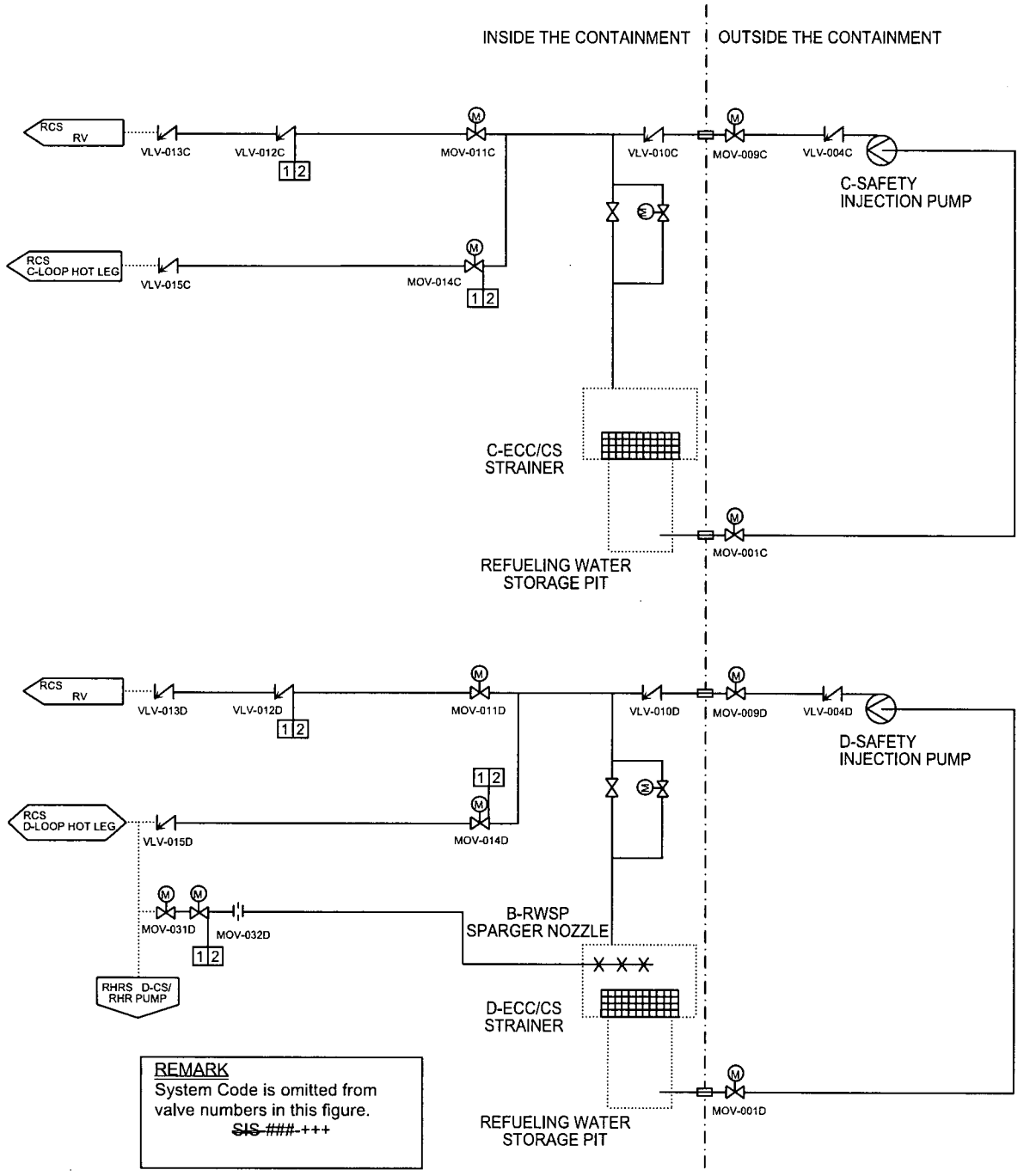

Figure 2.4.4-1 Emergency Core Cooling System (Sheet 2 of 4)

Table 3.2-2 Classification of Mechanical and Fluid Systems, Components, and Equipment (Sheet 32 of 58)

System and Components	Equipment Class	Location	Quality Group	~~10 CFR 50 Appendix B (Reference 3.2-8)~~Quality Assurance Classification[5]	Codes and Standards[3]	Seismic Category[4]	Notes	
Piping and valves in the Solid Waste Management System up to but not including the first valve interfacing with a system of a higher classification	6	A/B	N/A	~~N/A~~A	6	Note 1	Note 5.b	DCD_03.02.02-17
17. Refueling Water Storage System								
Refueling water recirculation pumps	3	R/B	C	~~YES~~Q	3	I		DCD_03.02.02-17
Refueling water storage pit	2	PCCV	~~B~~N/A	~~YES~~Q	5	I		
Refueling water storage auxiliary tank	4	O/B	D	~~N/A~~A	4	NS	Note 5.d	
Refueling water recirculation pumps discharge piping and valves in the refueling water storage system excluding piping downstream of the valve RWS-VLV-021	3	PCCV	C	~~YES~~Q	3	I		
Piping including branch piping and valves in the refueling water storage system from the refueling water storage pit up to and including the outermost containment isolation valves RWS-MOV-004,AOV-022, and valves RWS-VLV-041,042,045,061,062,075	2	PCCV R/B	B	~~YES~~Q	2	I		DCD_03.02.02-17
Refueling water recirculation pump suction piping from RWS-MOV-004(excluding) and from RWS-VLV-101(including) up to pumps	3	R/B	C	~~YES~~Q	3	I		DCD_03.02.02-17
~~RWSP transfer piping~~	~~2~~	~~PCCV~~	~~B~~	~~YES~~	~~2~~	~~I~~		MIC-03-03-00043
Reactor cavity overflow piping to the RWSP	2	PCCV	B	Q	2	I		DCD_03.02.02-17
Header Compartment overflow piping to the RWSP	2	PCCV	B	Q	2	I		
Refueling cavity drain piping	2	PCCV	B	~~YES~~Q	2	I		
Debris interceptor	~~6~~2	PCCV	N/A	~~N/A~~Q	5	~~I~~II		
RWSP Sparger	2	PCCV	B	Q	2	I		DCD_06.03-11