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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,



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

Enclosure:

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



CC: J. A. Ciocco
J. Tapia

Contact Information

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Docket No. 52-021
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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 |
| 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 |
| 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 |
| <u>Emergency letdown piping from the isolation valves to the RWSP spargers</u> | <u>Containment</u> |
| 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 |
| Refueling cavity drain piping | Containment |
| <u>Debris interceptors</u> | <u>Containment</u> |
| <u>Reactor cavity overflow piping to the RWSP</u> | <u>Containment</u> |
| <u>Header compartment overflow piping to the RWSP</u> | <u>Containment</u> |
| <u>RWSP overflow piping to C/V drain pump room</u> | <u>Containment</u> |

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2.4 REACTOR SYSTEMS

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 | - |
| 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 | = | -/- | = | = | = |
| RWSP Overflow Pipe Check Valves | RWS-VLV-078, 079 | 2 | Yes | = | -/- | = | = | = |
| RWSP Sparger Nozzle | RWS-SNZ-001A, B | 2 | Yes | = | -/- | = | = | = |

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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 |
| 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 |
| 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 |
| 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 |
| Refueling cavity drain piping | 2 | No | Yes |
| Reactor cavity overflow piping to the RWSP | 2 | No | Yes |
| Header compartment overflow piping to the RWSP | 2 | No | Yes |
| RWSP overflow piping to C/V drain pump room | 2 | No | Yes |

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Note:

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

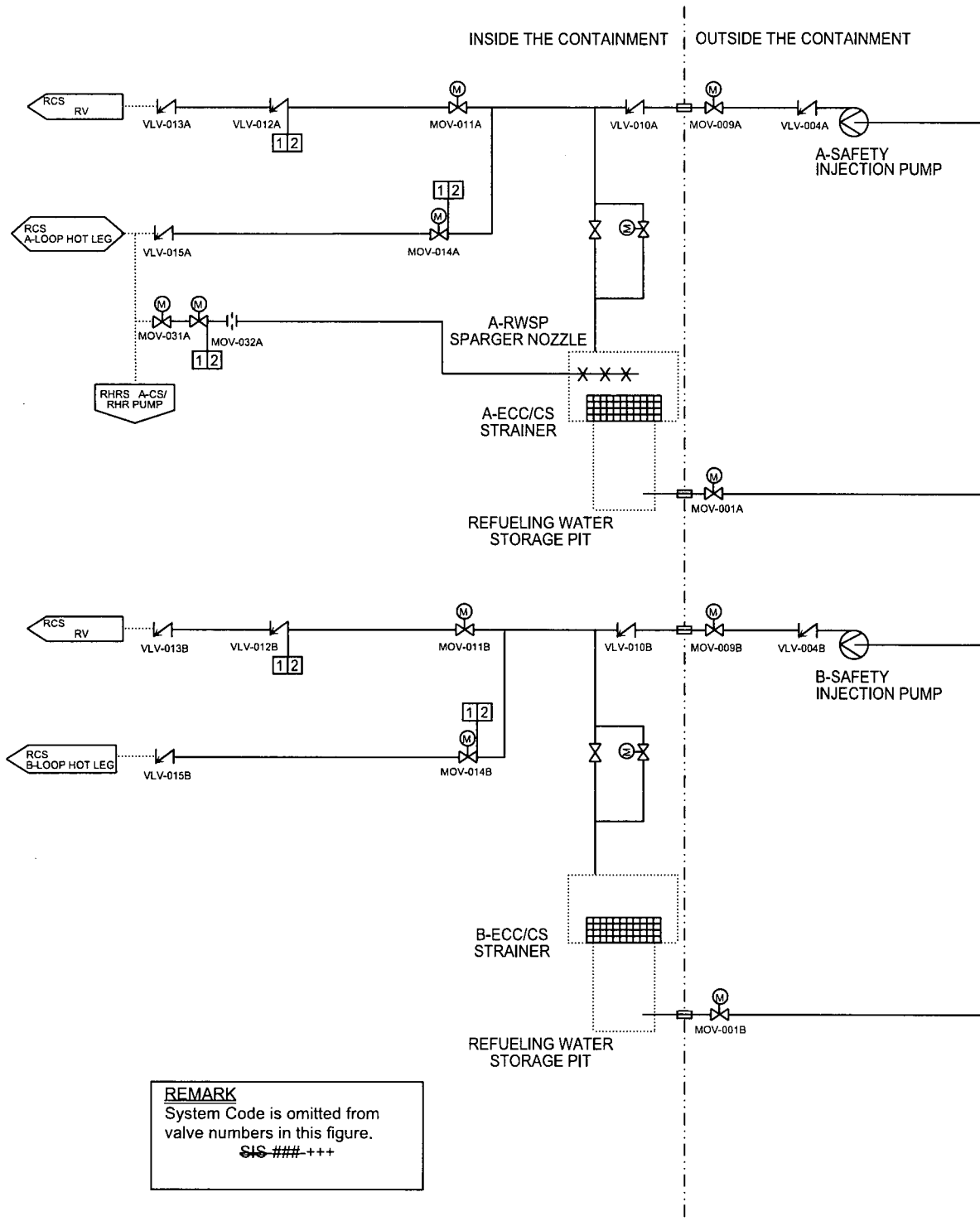


Figure 2.4.4-1 Emergency Core Cooling System (Sheet 1 of 4)

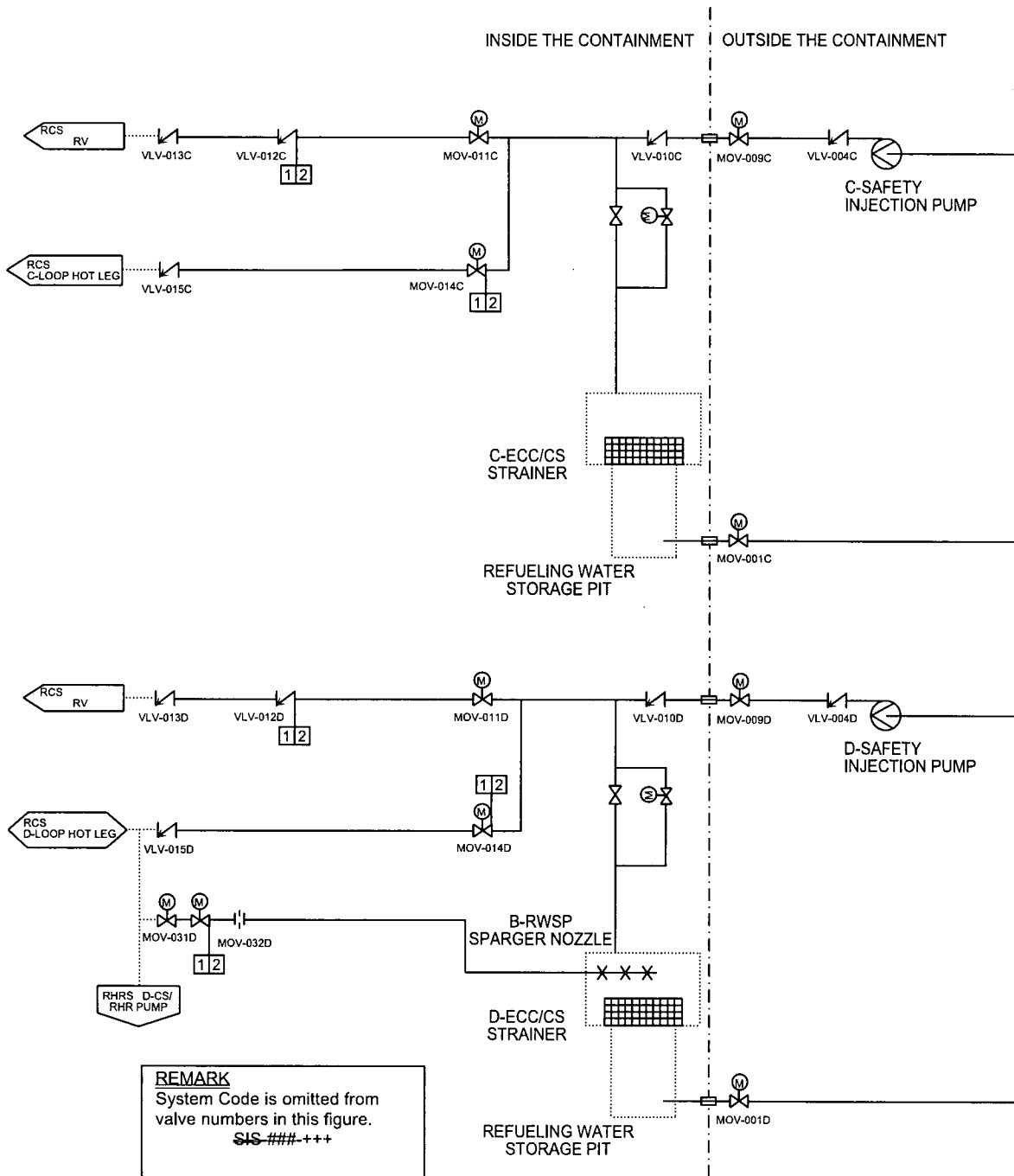


Figure 2.4.4-1 Emergency Core Cooling System (Sheet 2 of 4)

3. DESIGN OF STRUCTURES, SYSTEMS, COMPONENTS, AND EQUIPMENT

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 | 6 | Note 1 | Note 5.b |
| 17. Refueling Water Storage System | | | | | | | |
| Refueling water recirculation pumps | 3 | R/B | C | YESQ | 3 | I | |
| Refueling water storage pit | 2 | PCCV | BN/A | YESQ | 5 | I | |
| Refueling water storage auxiliary tank | 4 | O/B | D | N/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 | YESQ | 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 | YESQ | 2 | I | |
| Refueling water recirculation pump suction piping from RWS-MOV-004(excluding) and from RWS-VLV-101(including) up to pumps | 3 | R/B | C | YESQ | 3 | I | |
| RWSP transfer piping | 2 | PCCV | B | YES | 2 | I | |
| Reactor cavity overflow piping to the RWSP | 2 | PCCV | B | Q | 2 | I | |
| Header Compartment overflow piping to the RWSP | 2 | PCCV | B | Q | 2 | I | |
| Refueling cavity drain piping | 2 | PCCV | B | YESQ | 2 | I | |
| Debris interceptor | 5 | PCCV | N/A | N/AQ | 5 | II | |
| RWSP Sparger | 2 | PCCV | B | Q | 2 | I | |

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