MITSUBISHI HEAVY INDUSTRIES, LTD.
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TOKYO, JAPAN

September 29, 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-10261

Subject: MHI's Response to US-APWR DCD RAI No. 623-4942 Revision 0

Reference: 1) "Request for Additional Information No. 623-4942 Revision 0, SRP Section: 06.02.01 – Containment Functional Design – Application Section: 6.2.1" dated August 30, 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. 623-4942 Revision 0."

Enclosed is the response to Question 06.02.01-18 through 20 that are 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,

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

Enclosure:

1. Response to Request for Additional Information No. 623-4942 Revision 0

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

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Enclosure 1

UAP-HF-10261
Docket No. 52-021

Responses to Request for Additional Information No. 623-4942
Revision 0

September 2010

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

09/29/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 623-4942 REVISION 0**
SRP SECTION:	**06.02.01- CONTAINMENT FUNCTIONAL DESIGN**
APPLICATION SECTION:	**6.2.1**
DATE OF RAI ISSUE:	**8/30/2010**

QUESTION NO.: 06.02.01-18

RAI 06.02.01.05-3 – Supplement: In RAI 06.02.01.05-3 the staff requested justification for the use of 70°F as the minimum containment temperature. In your response you stated that 70°F is the Nil-Ductility Transition Temperature (NDTT) + 60°F, and that the NDTT is 10°F. Please, justify the NDDT value of 10°F.

ANSWER:

The Nil-Ductility Transition Temperature (NDTT) of 10 deg. F is justified in that all pressure boundary ferritic steels for Class 1 components will have a reference nil ductility temperature (RTNDT) less than 10 deg. F (see US-APWR DCD Rev.2 subsection 5.2.3.3.1), where the relationship between the NDTT and RTNDT is established based on ASME Code Sec. III NB-2330.

From previous experience, this requirement can be satisfied by the major suppliers of ferritic steel material, and therefore will be a requirement during procurement of US-APWR Class 1 components pressure boundary ferritic steel material.

As discussed in RAI 06.02.01.05-3, Pellini's fracture analysis diagram shows that the Fracture Transition Elastic (FTE) temperature is NDTT + 60 deg. F for pressure boundary ferritic steels used in Class 1 components. Therefore, for a minimum containment temperature of 70 deg. F, specified based on plants that have been designed and constructed by MHI over the past several decades, the NDTT of 10 deg. F is considered sufficient to prevent brittle fracture.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

09/29/2010

US-APWR Design Certification

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RAI NO.:	**NO. 623-4942 REVISION 0**
SRP SECTION:	**06.02.01- CONTAINMENT FUNCTIONAL DESIGN**
APPLICATION SECTION:	**6.2.1**
DATE OF RAI ISSUE:	**8/30/2010**

QUESTION NO.: 06.02.01-19

RAI 06.02.01.05-4 – Supplement: In RAI 06.02.01.05-4 the staff requested a justification of the use of only 2 ASIS to calculate the minimum containment pressure. MHI's response referred to assumptions used in DBA peak pressure analysis. However, the minimum pressure analysis requires different set of conservative assumptions. Since there are 4 ASIS available, all four should be assumed to be activated for removing the energy from the containment atmosphere at the highest possible rate. Please, revise your analysis with the assumption of all 4 ASIS operational and re-do the calculations accordingly.

ANSWER:

Active safety injection system (ASIS) in the context of US-APWR is four (4) independent trains of the high head safety injection system (HHIS) that employs four (4) safety-injection (SI) pumps.

Considering the effect of the expected spillage of subcooled SI water into the containment as an active heat sink, MHI will revise the minimum containment pressure analysis with the assumption of all 4 ASIS operational conformance with Branch Technical Position 6-2 B.2.B of Standard Review Plan.

Impact on DCD

Table 6.2.1-28, Table 6.2.1-29 and Figure 6.2.1-80 through Figure 6.2.1-83 will be needed to change. Also LBLOCA PCT evaluation will be revised by employing the results of the minimum containment pressure calculation. The DCD markups will be prepared by the end of 2010.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

09/29/2010

US-APWR Design Certification

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APPLICATION SECTION:	6.2.1
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QUESTION NO.: 06.02.01-20

RAI 06.02.02-7 – Supplement: In RAI 06.02.02-7, the staff requested evaluation of the HX fouling in the CSS/RHR system and its effect on heat removal capabilities. The applicant responded that HX fouling was considered, but values were not provided. Please, provide the values of the HX fouling used, including justification, as well as comparison of heat removal calculations with and without fouling.

ANSWER:

The CS/RHR heat exchanger are sized and specified considering a fouling factor of 0.0005 h ft^2 °F/Btu for closed cycle condensate water (Ref.: Standards of the Tubular Exchanger Manufacturers Association (TEMA)). Since tube side water of CS/RHR heat exchanger is primary reactor coolant, and its water chemistry is administratively controlled, significant fouling should not to occur. However, fouling factor is conservatively considered in CS/RHR heat exchanger design in accordance with TEMA. Therefore, the CS/RHR heat exchanges are designed to be fully capable of performing their intended function with consideration of fouling.

With regard to the comparison of heat removal calculation with and without fouling, value of U, overall heat transfer coefficient, and A, heat transfer area, are required. A value of UA is given by MHI but each U and A will be determined by heat exchanger vendor. Therefore, at this time, it is difficult to provide the comparison of heat removal calculations with and without fouling.

Impact on DCD

There is no impact on the DCD.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.