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May 8, 2009

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-09223

Subject: MHI's Response to US-APWR DCD RAI No. 287-2041 (45-day response)

References: 1) "Request for Additional Information No. 287-2041 Revision 1, SRP Section: 03.02.01 – Seismic Classification, Application Section: 03.02.01" dated 3/25/2009.

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. 287-2041 Revision 1."

Enclosed are the responses to questions 3.2.1-1, 2, 5, 8, and 13 of the RAI (Reference 1). Responses to the remaining five questions of this RAI have 60-day response times as agreed to between the NRC and MHI. The responses for these questions will be issued at a later date by a separate transmittal.

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,

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

Enclosures:

1. Response to Request for Additional Information No. 287-2041, Revision 1 (45-day response)

CC: J. A. Ciocco
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NRO

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Docket No. 52-021
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Enclosure 1

UAP-HF-09223
Docket No. 52-021

Response to Request for Additional Information No. 287-2041,
Revision 1 (45-day response)

May, 2009

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

5/8/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 287-2041 REVISION 1**
SRP SECTION:	**03.02.01 - Seismic Classification**
APPLICATION SECTION:	**03.02.01**
DATE OF RAI ISSUE:	**03/25/09**

QUESTION NO. RAI 03.02.01-1:

DCD Subsection 3.2.1, page 3.2-2, 4th paragraph, last sentence defines non-seismic (NS) SSCs that must maintain their structural integrity are designated as seismic Category II. DCD Subsection 3.2.1.1.3 defines non seismic (NS) as those SSCs not classified as seismic category I or seismic category II. Since NS is not the same as Seismic Category II, clarify why the term non-seismic (NS) is used to define seismic Category II in Subsection 3.2.1.

ANSWER:

As discussed in DCD Subsection 3.2.1; structures, systems, and components (SSC) are assigned to one of three seismic categories (I, II, or NS); depending on the nuclear safety function of the particular SSC. DCD Subsection 3.2.1, sixth paragraph, last sentence states that "non-seismic (NS) SSCs that must maintain their structural integrity are designated as seismic category II," is incorrectly worded. DCD Subsection 3.2.1 will be clarified as described below.

Impact on DCD

See Attachment 1 for the markup of DCD Tier 2, Section 3.2, Revision 2, with the following changes.

- Change the last sentence of the sixth paragraph of Subsection 3.2.1, to read as follows: "These SSCs that must maintain their structural integrity to prevent unacceptable structural interaction or failure with seismic category I SSCs are designated as seismic category II."

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

5/8/2009

US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021

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APPLICATION SECTION:	**03.02.01**
DATE OF RAI ISSUE:	**03/25/09**

QUESTION NO. RAI 03.02.01-2:

In DCD Subsection 3.2.3, COL 3.2(4) and 3.2(5) identify that the COL applicant is to identify site-specific SSCs. SRP 3.2.1 identifies plant features of the Ultimate Heat Sink (UHS) including (1) dams, (2) ponds, and (3) cooling towers to be Seismic Category I. Identify which site-specific SSCs are to be classified in the COLA and if these UHS plant features are site-specific SSCs.

ANSWER:

DCD Subsection 3.2.3, COL 3.2(4) requires the COL Applicant to identify site specific safety-related SSCs designed to seismic category I requirements. Ultimate Heat Sink (UHS) is one such SSC which is site specific. Based on the selection of the type of UHS, extent of safety-related boundary and seismic category I requirements will vary.

DCD Subsection 3.2.3, COL 3.2(5) requires the COL Applicant to identify the equipment classification and seismic category of the site specific safety-related and nonsafety-related fluid systems and components. Per this requirement, the COL Applicant will need to identify UHS make-up water, blowdown, chemical injection systems and components. Also, if required, water inventory transfer system between the cooling towers (bays) will be identified. This COL item is broad based and includes all site specific fluid systems and components such as circulating water system.

DCD Subsection 9.2.5.2, System Description, states that the COL Applicant is to determine the type of UHS (e.g. cooling pond, cooling towers), also Subsection 9.2.10, COL 9.2(18) states that the COL Applicant is to determine the type of the UHS based on site specific conditions and meteorological data.

DCD Table 3.2-4 identifies the UHS related structures (UHSRS) as seismic category I building and structure. A note to Table 3.2-4 will be added that UHSRS includes but not limited to retaining structures for (1) dams, and (2) ponds, or (3) cooling towers (including cooling tower enclosure, basin, and pump house). The specific features of the UHSRS are site dependent and

not part of the US-APWR standard plant. The UHSRS are seismic category I structures designed and selected based on site specific conditions and site specific meteorological data. The COL Applicant is to determine the type of UHS for the plant.

Impact on DCD

See Attachment 1 for the markup of DCD Tier 2, Section 3.2, Revision 2, with the following changes.

- A new Note 4 footnote will be added to Table 3.2-4, the UHS Related Structures row: "UHS Related Structures[4]"

- A new Note 4 will be added to Table 3.2-4:

  "UHSRS include but are not limited to (1) dams, (2) ponds, or (3) cooling towers (including cooling tower enclosure, and pump house). The specific features of the UHSRS are site dependent and not part of the US-APWR standard plant. The UHSRS are seismic category I structures selected based on site specific conditions and site specific meteorological data."

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

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DATE OF RAI ISSUE:	**03/25/09**

QUESTION NO. RAI 03.02.01-5:

The risk insights report for the APWR (Risk Insights for the Review of US APWR Design R0) identifies the Leak Detection System (LDS) for the Reactor Coolant Pressure Boundary (RCPB) as having a high importance. DCD Subsection 3.1.2.5.1states: "Instrumentation is provided to detect significant leakage from the RCPB with indication in the MCR (see Section 5.2)." However, Section 5.2.5.5 states: "Leak detection monitoring has no safety-related function." DCD Table 17.4-1 identifies risk-significant SSCs, but the LDS does not appear to be included. Clarify the risk significance of the leak detection system and if the RCPB LDS belongs under the Phase 1 D-RAP program as discussed in section 17.4 of the DCD.

Also, if this system does belong under the Phase 1 D-RAP program, discuss where in DCD Subsections 3.2, 17.4.7.1 and Table 17.4-1 this system has been identified and if augmented requirements such as a graded approach is to be applied to the seismic design and QA.

ANSWER:

The Reactor Coolant Pressure Boundary (RCPB) Leak Detection System (LDS) is not listed in Table 17.4-1. The risk significance of SSCs in the LDS was not considered since the system has a small effect on the probability of a large break LOCA. The RCPB Leak Detection System, which is non safety-related but has the important function of monitoring RCPB integrity, is designed to be qualified in accordance with Regulatory Guide 1.45.

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.

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QUESTION NO. RAI 03.02.01-8:

In DCD Table 3.2-2, page 3.2-47, the Equipment Class 6 (RWMS components) systems and components refer to RG 1.143 for the seismic category, which is in accordance with the SRP 3.2.1. DCD Table 1.9.1-1 identifies compliance with RG 1.143. However, RG 1.143 defines three hazard levels with different seismic design requirements for each level. Identify the specific hazard level for the Equipment Class 6 RWMS systems and components so that seismic requirements are identified.

ANSWER:

Component hazard classifications are performed separately in accordance with the guidelines provided in RG 1.143, Figure 2 – Flowchart of Safety Classification Process, and the limits in 10 CFR 71, Appendix A, "Determination of A_1 and A_2". The component hazard classifications are incorporated in the equipment datasheets for the purpose of equipment specifications. As an example, the Waste Holdup Tanks have a hazard classification of "IIc", and the foundation anchorage is designed with the applicable UBC code, in accordance with the guidelines in RG 1.143. DCD Table 3.2-2 has incorporated note (1) designating component seismic category meeting RG 1.143. This note covers the design intent adequately; therefore, no change to Table 3.2-2 is required.

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.

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QUESTION NO. RAI 03.02.01-13:

DCD Tier 1 Chapter 2 and DCD Tier 2 Subsection 14.3 describe various ITAAC to confirm the ability of safety-related seismic Category I SSCs to withstand a design basis seismic event. It is not clear if there is a proposed ITAAC or DAC to address nonsafety-related Seismic Category II SSCs. Identify if there is an ITAAC or DAC to address Seismic Category II SSCs or explain why an ITAAC or DAC is not required.

ANSWER:

The answer to RAI 156-1877, question 14.3-2, concurred with the need for ITAAC for non-seismic Category I (i.e., seismic category II and non seismic) structures to verify their failure will not impair the ability of nearby safety-related SSCs to perform their safety-related functions.

SRP Section 14.3.2, Acceptance Criterion II.6 states in part that for non-seismic SSCs, the need for ITAAC to verify that their failure will not impair the ability of near-by safety-related SSCs to perform the safety-related functions should be assessed based on the specific design. The SRP also acknowledges that in certain cases due to details of the final design and as-built configuration, non seismic to seismic interactions may not be evaluated until the plant is constructed. General ITAAC have been included in DCD Tier 1 to verify the functional arrangement of SSCs. The acceptance criteria for these ITAAC include the inspection/verification of as-built SSCs. Therefore, ITAAC that verify the as-built plant may also include verification that SSCs are designed and constructed to avoid adverse II/I interactions including seismic category II SSCs. Refer also to RAI 54, Question 14.03.07-3.

Impact on DCD

Refer to the "Impact on DCD" for RAI 156-1877, question 14.3-2, for changes to DCD Tier 1, Section 2.2, that are applicable to this response for RAI 287-2041, question 03.02.01-13.

Impact on COLA

There is no impact on the COLA.

Impact on PRA

There is no impact on the PRA.

This completes MHI's responses to the NRC's questions.

These QA program requirements are applied to activities affecting safety-related functions of SSCs designated as seismic category I, commensurate with their importance to safety.

RG 1.29 (Reference 3.2-5) is used to identify and classify those SSCs (including their foundations and supports) required for safe-shutdown, that must be designed to withstand the effects of the SSE and remain functional, as seismic category I. The recommendations in RG 1.29 (Reference 3.2-5) are used for systems, other than RWMS, that contain, or may contain, radioactive material and whose postulated failure would result in potential offsite whole body (or equivalent) doses that are more than 0.5 roentgen equivalent in man (rem), and are classified as seismic category I. Compliance with RG 1.29 (Reference 3.2-5) assures that a designed-in safety margin is provided for bringing the reactor to a safe-shutdown condition, while also reducing potential offsite doses from seismic events.

Some SSCs required for operation (excluding electrical features) do not need to be designed to seismic category I requirements. Examples of these SSCs include those portions of seismic category I systems such as vent lines, drain lines, fill lines and test lines on the downstream side of isolation valves and those portions of the system not required to perform a safety function.

The SSCs that are not designated as seismic category I and are not required to remain functional following an SSE, but whose failure could reduce the functioning of any seismic category I SSCs to an unacceptable safety level are designed and constructed to maintain their structural integrity under seismic loading from the SSE. These ~~non-seismic (NS)~~ SSCs that must maintain their structural integrity to prevent unacceptable structural interaction or failure with seismic category I SSCs are designated as seismic category II.

Seismic category I applies to both the functionality and the integrity of the SSCs. Seismic category II applies only to the integrity of SSCs. Items that are subjected to an SSE, or items that create seismically-induced flooding, are designated as seismic category II to prevent the loss of the function of any safety-related items.

US-APWR SSCs are assigned to one of three seismic categories (seismic category I, seismic category II, or NS) depending on the nuclear safety function or the particular SSC.

RG 1.151 (Reference 3.2-9) is used as guidance for the seismic design and classification of safety-related instrumentation sensing lines. The seismic classification of safety-related instrumentation sensing lines is in accordance with RG 1.151 (Reference 3.2-9), Positions C.2 and C.3. The use of this guidance assures that the instrument sensing lines used to actuate or monitor safety-related systems are appropriately classified and are capable of withstanding the effects of the SSE.

GDC 61 requires that RWMS, and other systems that may contain radioactivity, be designed to assure adequate safety under normal and postulated accident conditions. Postulated conditions considered with respect to seismic design and classification of SSCs include the loss of SSC integrity and potential radioactive releases as a result of seismic events. RG 1.143 (Reference 3.2-10) is used as guidance relative to seismic design and classification for radioactive waste management SSCs. The use of the classification information and design criteria provided in the RG 1.143

Table 3.2-4 Seismic Classification of Buildings and Structures[1]

Structure	Acronym	Seismic Category[2]
Reactor Building[3]	R/B	I
Prestressed Concrete Containment Vessel[3]	PCCV	I
Containment Internal Structure[3]		I
Power Source Building (East and West)[3]	PS/B	I
Power Source Fuel Storage Vault	PSFSV	I
Essential Service Water Pipe Tunnel (ESWPT) (from/to UHS)	ESWPT	I
UHS Related Structures [4]	UHSRS	I
A/B[3]	A/B	II
Turbine Building	T/B	II
AC/B[3]	AC/B	NS
Outside Building (e.g., maintenance facility, operations office)	O/B	NS
Turbine generator pedestal	T/G Pedestal	NS

Notes:

1. Other non-standard plant building structures, such as minor NS buildings and structures in the plant yard, are not listed in the above table and are not considered part of the US-APWR Nuclear Island.

2. Seismic category I (I)
   Seismic category II (II)
   Non-Seismic (NS)

3. US-APWR Nuclear Island

4. UHSRS include but are not limited to (1) dams, (2) ponds, or (3) cooling towers (including cooling tower enclosure, and pump house). The specific features of the UHSRS are site dependent and not part of the US-APWR standard plant. The UHSRS are seismic category I structures selected based on site specific conditions and site specific meteorological data.