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TOKYO, JAPAN

February 8, 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-12039

Subject: **MHI's Response to US-APWR DCD RAI No. 887-6261 Revision 3 (SRP 09.01.04)**

Reference: 1) "Request for Additional Information No. 887-6261 Revision 3, SRP Section 09.01.04 – Light Load Handling System (Related to Refueling) - Application Section: 9.1.4", dated January 10, 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. 887-6261 Revision 3."

Enclosed is the response to a 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 the submittals. His contact information is below.

Sincerely,

Y. Ogata

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

Enclosure:

1. Response to Request for Additional Information No. 887-6261 Revision 3

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NRO

CC: J. A. Ciocco
J. Tapia

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Enclosure 1

UAP-HF-12039
Docket No. 52-021

Response to Request for Additional Information No. 887-6261
Revision 3

February 2012

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

02/08/2012

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 887-6261 REVISION 3**
SRP SECTION:	**09.01.04 – LIGHT LOAD HANDLING SYSTEM (RELATED TO REFUELING)**
APPLICATION SECTION:	**09.01.04**
DATE OF RAI ISSUE:	**01/10/2012**

QUESTION NO.: 09.01.04- 23

FSAR Sections 5.3.1.2 and 5.3.1.3 state, respectively, that once the reactor vessel is installed at the site, a field weld is made to attach the reactor vessel permanent cavity seal ring to the reactor vessel seal ledge, and that the permanent cavity seal ring is welded to the top of the seal ledge of the vessel flange for welding to the refueling cavity seal liner. Further, in response to several RAIs, the applicant provides a more detailed description of the permanent cavity seal (PCS). In its responses to RAI 633-4857 revision 02, Question 09.01.04-21 and to RAI 721-5535 revision 2, Question 09.01.04-22, the applicant clarifies that the seal is treated as a mechanical component and is made of a stainless steel material. The seal is permanently attached to the reactor vessel and the reactor cavity floor with bolts and welds. It also states that appropriate sections/criteria of the ASME Code, or codes and standards recommended by manufacturers shall be applied in selection of material and manufacture such as the welding of the seal. Moreover, the response from MHI to RAI 724-5524 revision 2, Question 03.02.02-20, revises the classification of the PCS, such that the seal will be classified as a safety-related Equipment Class 3. Quality Group C, and designed in conformance with appropriate codes and standards selected according to this classification and the Quality Assurance Program. Accordingly, the applicant modifies Item 28 in Table 3.2-2.

Based on the above elements, especially from the text and the figure that will be added to DCD Section 9.1.4.2.1, the staff deduced that some parts of the PCS are welded/bolted to the reactor vessel. However, the staff was not able to identify precisely which parts and how they are attached to the reactor vessel. Therefore, it is not clear to the staff whether the PCS design and installation could adversely affect the reactor vessel material and its integrity. The staff also noted that in revised Table 3.2-2 the applicant kept the identification number for "Codes and standards" as "5" corresponding to "codes and standards as in defined bases" and did not modify this number to "3" corresponding to "ASME Code, Section III, Class 3." The staff considers that this is not consistent with the new categorization of the PCS as a Class 3component, according to which the relevant ASME Code criteria should be selected.

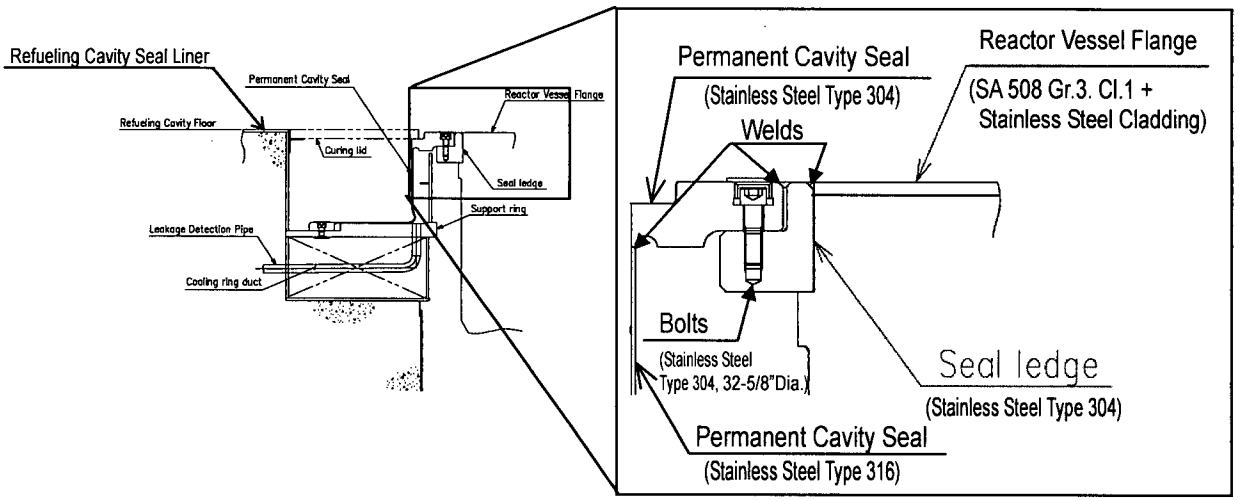
Because of the importance of the interfaces between the PCS and the reactor vessel, the staff requests the applicant provide the following information to assure that the fabrication and installation of this PCS will not adversely impact the reactor vessel material or structural

integrity (e.g., to behave in a brittle manner or increase the probability of rapidly propagating failure):

- Describe in detail the PCS, especially the seal ledge, including the identification of the materials that are used;
- Identify any fasteners, bolts or welds used in the PCS;
- Describe in detail the connections between the PCS and the reactor vessel, particularly with the reactor vessel pressure retaining portion. If welding is used, describe any design considerations (such as weld joint type or location) or controls on welding (such as weld size or heat input limitations) that assure that welding has no adverse impact on the reactor vessel material or integrity.
- Justify why the identification number for "Codes and standards" in revised Table 3.2-2 does not correspond to the identification number for a Class 3 equipment implying that ASME Code Section III, Class 3 will not be applied to the PCS.

ANSWER:

(First and Second Bullets)
The detail configuration and materials of the Permanent Cavity Seal (PCS) around the Seal Ledge (SL) are described below. The SL is ring type configuration attached to outside of the Reactor Vessel (RV) and made out of stainless steel. The SL is supported by the RV at the bottom, welded to the PCS and the RV flange at the top, and bolted to the PCS. The welding at the top of the SL are continuous welds and used for sealing the cavity water.



(Third Bullet)
There are partial penetration continuous welds and bolts connecting the PCS, the SL, and the RV. The first connecting weld (between the SL and the RV) and the second connecting weld (between the PCS and the SL) are both used for sealing but not for structural support. The SL is supported by the RV at the bottom, and is designed so that the weld is within the cladding of the RV, which does not affect the structural integrity of the RV. The PCS is bolted and seal welded to the SL since it can only be installed at site. The welding between the SL and the RV will be controlled and inspected based on ASME because of the first connecting weld to pressure retaining portion.

(Fourth Bullet)
Since the PCS is not a pressure-retaining component for the Reactor Coolant System (RCS), ASME BPVC Section III does not apply to the seal itself. In terms of the relationship with the reactor vessel, to which ASME BPVC Section III, Subsection NB applies, the ASME BPVC Section III is not applicable to the PCS and the connecting weld between the seal and the SL for the following reasons:

- The PCS is indirectly attached to the reactor vessel through the SL, as shown in the figure above.
- The SL has neither pressure-retaining function nor structural function.
- In accordance with ASME BPVC Section III, NB-1132.2 (e), stating that "The first connecting weld of a welded nonstructural attachment to a component shall be considered part of the attachment. At or within 2t from the pressure-retaining portion of the component, the first connecting weld shall conform to NB-4430.", the SL and its connecting weld to the RV is not a part of the vessel, but an attachment to the vessel.
- Moreover, while the first connecting weld (in this case, the connecting weld between the SL and the vessel) is required to conform to NB-4430, there is no requirement for the second connecting weld, namely, the connecting weld between the SL and the PCS.

As indicated in the Note 1 for the DCD Tier 2 Table 3.2-3, items not covered by the ASME Code are designed to other applicable codes and standards. Therefore, the identification number for "Codes and Standards" for the PCS in DCD Tier 2 Revision 3 Table 3.2-2 should be "5" corresponding to "Codes and standards as defined in design bases".

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.

Impact on Technical / Topical Reports

There is no impact on the Technical / Topical Reports.