REQUEST FOR ADDITIONAL INFORMATION 887-6261 REVISION 3

1/10/2012

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 09.01.04 - Light Load Handling System (Related to Refueling)
Application Section: 9.1.4

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

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.