REQUEST FOR ADDITIONAL INFORMATION 457-3305 REVISION 0

9/14/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 04.05.01 - Control Rod Drive Structural Materials
Application Section: 4.5.1

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

04.05.01-8

In RAI 04.05.01-1 (3) [RAI 2181-4.5.1-1], the staff requested that the applicant list weld filler classifications for CRDM welds. The applicant provided a proposed revision to Table 4.5-1 by letter dated April 28, 2009. The applicant's proposed revision lists SFA 5.9 ER309/EC316L to weld the latch housing to the rod travel housing. However, the staff is unable to locate EC316L in SFA 5.9. Also, the sketch of the CRDM, provided by the applicant in its response to RAI 4.5.1-1, lists SFA 5.14 ERNiFe-7A weld filler material. The staff notes that ERNiFe-7A is not listed in SFA 5.14 and neither FSAR Section 4.5.1 nor Section 5.2.3 identifies the weld filler material used to join the CRDM pressure housing to the RPV head CRDM nozzle. The staff also notes that FSAR Subection 4.5.1.1 states that a detailed description of the austenitic stainless steel for the CRDM pressure housing is given in Subsection 5.2.3 but the staff is unable to locate a listing for CRDM materials in Subsection 5.2.3 or Table 5.2.3-1. The staff requests that the applicant address the above and modify the FSAR accordingly.

In RAI 04.05.01-1(5) [RAI 2181-4.5.1-1] the staff requested that the applicant identify the materials in Table 4.5-1 that are exposed to reactor coolant. The applicant provided a proposed revision of Table 4.5-1 that identifies which CRDM materials are exposed to reactor coolant. The staff notes that ER309L/EC316L is identified as not being exposed to reactor coolant. The staff requests that the applicant verify that the weld between the rod travel housing and the latch housing is not exposed to reactor coolant.

In RAI 04.05.01-1(6) [RAI 2181-4.5.1-1] the staff requested that the applicant modify Subsection 4.5.1 to address its compliance with GDC 26. In the applicant's response, it indicated that it will modify FSAR Section 4.5.1 to address GDC 26 but the applicant did not provide a proposed version of it's modification. The staff requests that the applicant provided it's proposed modification to FSAR Section 4.5.1 to address RAI 04.05.01-1 (6) .

04.05.01-9

In RAI 04.05.01-2 (RAI 2181-01-2), the staff requested that the applicant address inconsistencies between FSAR Subsections 4.5.1.1 and 5.2.3 regarding cold worked materials. In the applicant's response, dated April 28, 2009, the applicant stated that

strain hardened and/or cold worked material is not specified for CRDM materials. The applicant also stated that it will delete references to cold worked materials in FSAR Subsection 4.5.1.1. In order to provide clarity in the FSAR, the staff requests that the applicant additionally modify FSAR Subsection 4.5.1.1 to state that strain hardened and/or cold worked austenitic stainless steels are not used in CRDM components.

04.05.01-10

In RAI 04.05.01-3 (RAI 2181-01-03) the staff requested that the applicant specify a maximum carbon content limit of 0.03% for austenitic stainless steels. In addition, the staff requested that the applicant list FSAR Subsection 4.5.1 in Table 1.9.1-1 under the line item for RG 1.44. The applicant responded by letter dated April 28, 2009 and stated that because PWR primary water is controlled under 0.1 ppm, stress corrosion cracking is not a concern. The applicant did not address the staff's request to modify Table 1.9.1-1. In order to complete its review of FSAR Subsection 4.5.1, the staff requests the following:

1. The staff requests that the applicant list FSAR Section 4.5.1 in Table 1.9.1-1 under the line item for RG 1.44.

2. The staff requests that the applicant verify, and state in the FSAR, that a stagnant primary coolant environment will not exist in any portion of CRDMs that could result in elevated dissolved oxygen above 0.05ppm. If elevated dissolved oxygen is possible, state that the dissolved oxygen content will be less than 0.10%. The staff notes that elevated dissolved oxygen content in a stagnant primary coolant environment has contributed to stress corrosion cracking in operating PWRs and the applicant should address, in the FSAR, how the US-APWR CRDM design addresses potential elevated dissolved oxygen.

3 FSAR Subsection 4.5.1.2 states that furnace sensitized material is allowed. The staff requests that the applicant identify components that will be furnace sensitized and discuss the maximum carbon content allowed for those components. In addition, discuss the operating experience with furnace sensitized material in operating plants and verify that the carbon content, of the material used to produce the figure provided in response to RAI 04.05.01-3, is greater than that which will be used for all austenitic stainless steel CRDM components. The FSAR should be modified to include a discussion that specifically addresses furnace sensitized components and the potential for the susceptibility of these components to stress corrosion cracking.