

REQUEST FOR ADDITIONAL INFORMATION 329-1860 REVISION 0

4/8/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 10.03 - Main Steam Supply System

Application Section: SRP 10.3

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

10.03-1

Request for Additional Information

U.S. APWR DCD - RAI 10.3-1:

Conformance to GDC 4, as related to environmental and dynamic effects, requires that the safety-related portions of the main steam supply system (MSSS) design should adequately consider water (steam) hammer and relief valve discharge loads to assure that system safety functions can be performed and should assure that operating and maintenance procedures include adequate precautions to prevent water (steam) hammer and relief valve discharge loads. During its review of Section 10.3.2.4, 'System Operation' of the US-APWR DCD, the NRC staff noted that the applicant did not address the issue of water (steam) hammer, relief valve discharge loads, and water entrainment effects as described in GDC 4 ("SRP Acceptance Criteria," Item II of SRP Section 10.3). Therefore, the staff requests the applicant to provide additional information to address these effects.

Further, Item 1 in Section IV, "Evaluation Findings" of SRP Section 10.3 for the MSSS describes that the applicant will review operating and maintenance procedures to alert plant personnel to the potential for, and means to minimize, water (steam) hammer occurrences, and this commitment is to be stated in the applicant's safety analysis report (SAR). However, Section 10.3 of the DCD does not address operating and maintenance procedures that include any precautions to avoid the water (steam) hammer or water entrainment effects. Also, the FSAR does not address any combined license (COL) information item for the COL applicants to develop and implement these procedures. Therefore, the staff requests the applicant to provide additional information to the staff, and also update the DCD to address these effects. Further, the staff requests the applicant to provide a COL information item to ensure procedures are established to preclude water (steam) hammer and water entrainment effects. Furthermore, the staff requests the applicant to provide information pertaining to any analyses performed, if any, in this regard.

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10.03-2

U.S. APWR DCD - RAI 10.3-2:

MSSS compliance with GDC 34, as relates to residual heat removal (RHR), requires that the safety-related portion of the MSSS is to remove residual and sensible heat from the reactor coolant system (RCS) in pressurized water reactor (PWR) plants (Item 3, Section IV, Evaluation Findings," of SRP Section 10.3). The MSSS of the U.S. APWR provides this function of cooling the RCS by venting SG steam to atmosphere by the main steam depressurization valves (MSDVs). In FSAR Section 10.3.2.4.2, "Emergency Operation," the DCD describes that the MSDVs are used to remove the reactor decay heat and primary system (i.e., RCS) sensible heat in order to cooldown the RCS to the conditions at which the RHR system can perform the remaining cooldown function. In the event that one MSDV is not available, the US-APWR DCD states that the remaining MSDVs are sufficient to cooldown the plant. Further, in Item B, "Main Steam Depressurization Valve," of FSAR Section 10.3.2.3.3, the DCD describes that the MSDVs are designed to provide controlled removal of reactor decay heat, in conjunction with the emergency feedwater system (EFWS), during safe shutdown after a plant transient, accident condition or emergency condition when the turbine bypass system is not available. However, it is not clear how the motor operated MSDVs will function during an accident coincident with a loss of off-site power and what design features are used in the coping analysis for a Station Blackout (SBO) event per 10 CFR 50.63, "Loss of all alternating current power." Therefore, the staff requests the applicant to provide additional information in this regard. Also, the staff requests the applicant to explain the capabilities of the MSDVs cooling the RCS, in case when an MSDV is not available.

10.03-3

U.S. APWR DCD - RAI 10.3-3:

With respect to conformance to 10 CFR 50.63, as it relate to an SBO event, in FSAR Tier 2 Section 10.3.1.1, the DCD states that the U.S. APWR is provided with an alternate alternating current (AAC) power source to cope with an SBO event. The regulatory requirement is that each light-water-cooled nuclear plant must be able to withstand for a specified duration and recover from an SBO event. The factors that are considered for the SBO duration include, but not limited to, redundancy and reliability of the onsite emergency AC power sources. Also, FSAR Tier 2 Section 8.4, "Station Blackout," of the DCD describes the regulatory requirements, recovery from SBO, an analysis, and other SBO pertinent details. However, the DCD does not provide and/or identify any details regarding which components of the MSSS are required to be functional and what their emergency power sources are during an SBO event. FSAR Section 10.3.3 identifies that redundant power supplies are provided to operate MSIVs for containment isolation. However, the DCD does not address its functionality and emergency power source during an SBO. Additionally, FSAR Tier 2 Section 8.4.3, "Combined License Information," states that no additional information is required to provide by a COL applicant as related to an SBO. In order to complete its review of this area as related to 10 CFR 50.63 requirement for SBO event, the staff requests the applicant to provide design and operating details for the MSSS and its components as related to the SBO. Also, the staff requests the applicant to provide supporting justification that the AC power

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source to the MSSS components is adequate to withstand and recover from an SBO event.