

# REQUEST FOR ADDITIONAL INFORMATION 432-3206 REVISION 0

7/30/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 08.02 - Offsite Power System

Application Section: 08.02

## QUESTIONS for Electrical Engineering Branch (EEB)

### 08.02-10

In RAI 4-205 Question 08.02-1 the staff requested MHI to revise Section 08.-02, Chapter 8 of the DCD to include a discussion on grid stability analysis justifying the assumed 3-second time delay for loss of offsite power as described in MHI's letter dated February 8, 2008 to the NRC. In the current version of the US-APWR FSAR, the 3 second time delay for loss of offsite power is not described in Section 8.2, "Offsite Power" of the DCD. In addition the staff asked MHI to provide the minimum voltage and frequency limits for the offsite power as an interface requirement that the COL applicant must maintain to ensure correct operation of the RCPs to satisfy Chapter 15 analysis for a minimum of 3 seconds.

During the March 23, 2009 teleconference, MHI agreed to add in future revisions of the DCD (Rev 2) a discussion on grid stability analysis justifying the assumed 3-second time delay for loss of offsite power. In addition, MHI agreed to add an interface requirement for the COL applicant in the upcoming DCD revision (Rev 2) for minimum voltage and frequency limits for offsite power to ensure correct operation of RCPs to satisfy Chapter 15 analysis.

The staff requests that MHI docket its response confirming the above actions to resolve this RAI question.

### 08.02-11

In RAI 4-205 Question 08.02-2 the staff requested MHI to specify the allowed grid voltage drop that the COL applicant must maintain on the high side of the main step-up transformer (MT), and reserve auxiliary transformer (RAT) from the pre-trip steady-state voltage in order to maintain reactor coolant pump operation for 3 seconds following a turbine trip. The staff believes that the DCD should contain minimum voltage and frequency requirements at the switchyard to ensure satisfactory operation of the RCPs for 3 seconds after a reactor trip to satisfy the Chapter 15 analysis. The COL applicant would then need to perform the needed analyses, such as grid stability analysis to meet these minimum voltage and frequency limits.

During the March 23, 2009 teleconference, MHI agreed to add in future revisions of the DCD (Rev 2) the operating characteristics of the RCPs and the minimum voltage and frequency requirements at the switchyard to ensure satisfactory operation of the RCP after a reactor trip for 3 seconds.

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The staff requests that MHI docket its response confirming the above actions to resolve this RAI question.

### 08.02-12

In RAI 4-205 Question 08.02-3 the staff requested MHI to include an interface requirement for the COL applicant to perform a grid stability analysis to show that, with no electrical system failures, the grid will remain stable and the reactor coolant pump bus voltage will remain above the voltage required to maintain the flow assumed in the Chapter 15 analyses for a minimum of 3 seconds following a turbine trip.

During the March 23, 2009 teleconference, MHI agreed to add in future revisions of the DCD (Rev 2) an interface requirement for the COL applicant to perform a grid stability analysis as discussed in the RAI 4-205 Question 08.02-3.

The staff requests that MHI docket its response confirming the above actions to resolve this RAI question.

### 08.02-13

In RAI 4-205 Question 08.02-4 the staff requested MHI to include a description of the design features provided to prevent connection of the alternate power on to a faulted bus when the buses are transferred from the reserve auxiliary transformers to the unit auxiliary transformer.

During the March 23, 2009 teleconference, MHI agreed to add in future revisions of the DCD (Rev 2) a description of the design features as requested in RAI 4-205 Question 08.02-4.

The staff requests that MHI docket its response confirming the above actions to resolve this RAI question.

### 08.02-14

In RAI 4-205 Question 08.02-5 the staff expressed its concern that the proposed electrical design for the safety and non-safety buses as shown in Figure 8.1-1 of the US-APWR FSAR may not satisfy the criteria of SECY-91-078, "EPRI's Requirements Document and Additional Evolutionary LWR Certification Issues." The guidance given in the above documents state that the evolutionary plant design should include at least one offsite circuit to each redundant safety division supplied directly from one of the offsite power sources with no intervening nonsafety buses in such a manner that the offsite source can power the safety buses upon a failure of any non-safety bus.

The staff asked MHI to discuss and provide rationale how the proposed electrical design meets the guidance given in SECY-91-078 which states that offsite source can power the safety buses upon a failure of any non-safety bus. This issue is the same as was discussed in part b of the RAI 10-453 Question 08.03.01-8.

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During the March 18, 2009, and March 23, 2009 teleconferences, MHI agreed to revise the design of the supply power to the non-safety buses P1 and P2 such that these non-safety buses will be supplied from UATs normally. MHI agreed that it will revise the electrical design, appropriate drawings and FSAR to ensure that the power to the safety buses is supplied directly from the offsite (RAT transformers) with no intervening non-safety buses.

The staff requests that MHI docket its response confirming the above actions to resolve the above RAI question.

### 08.02-15

In RAI 4-205 Question 08.02-6 the staff asked MHI to provide information on the design of the generator load break switch (GLBS) and how it complies with the criteria and guidelines of SRP Section 8.2, Appendix A, "Guidelines for Generator Circuit Breakers/Load Break Switches."

During the March 23, 2009, teleconference, MHI agreed to add in future revisions of the Section 8.2 of the DCD (Rev 2) a discussion on the GLBS to indicate that it is designed in accordance with SRP Section 8.2, Appendix A criteria and guidelines.

The staff requests that MHI docket its response confirming the above actions to resolve the above RAI question.

### 08.02-16

In RAI 4-205 Question 08.02-7 the staff asked MHI to provide justification for not including neutral overcurrent and sudden pressure protection for Main Transformer (MT), RATs and UATs in accordance with the recommendations of IEEE-Std-666, "IEEE Design guide for Electric Power Service Systems for Generating Systems." In their response to the staff RAI, MHI stated that the MT, UATs and RATs have sudden pressure relays (SPRs) and ground fault protection relays (50/51N).

During the March 23, 2009, teleconference, MHI agreed to revise the description of electrical protection schemes in the future revisions of the Section 8.2 of the DCD (Rev 2) to indicate that MT, UATs and RATs have these protective design features. MHI stated that it will include an interface requirement in the DCD for COL applicant to describe any site specific electrical protection scheme in FSAR Section 8.2 of COL application.

The staff requests that MHI docket its response confirming the above actions to resolve the above RAI question.