

## REQUEST FOR ADDITIONAL INFORMATION 600-4755 REVISION 2

6/15/2010

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants  
Application Section: 14.2

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

14.02-122

SRP Section 14.2, Item 5 under SRP Acceptance Criteria, specifies that applicants should provide abstracts of planned tests to demonstrate and verify the performance capabilities of SSCs and design features that serve functions that are important to safety. The staff found the information in the DCD to be insufficient in this regard. In particular, additional information is needed to address the following items:

- 1) Tier 2 Test 14.2.12.1.26 specifies preoperational testing for the extraction non-return valves. However the test specification is inadequate in that required closure times are not specified and confirmed, and it isn't clear why testing to demonstrate adequate valve performance for the electrical, mechanical, and manual (remote and local) turbine trip functions is not specified. Consequently, additional information is needed and the test specification should be revised as appropriate to include this information.
- 2) Tier 2 Test 14.2.12.1.27 specifies preoperational testing for the main turbine stop, control, reheat stop, and intercept valves. However, the test specification is inadequate in that required valve closure times are not specified and confirmed, and it isn't clear why testing to demonstrate adequate valve performance for the electrical, mechanical, and manual (remote and local) turbine trip functions is not specified. Consequently, additional information is needed and the test specification should be revised as appropriate to include this information.
- 3) Preoperational testing is specified by the test specifications in Tier 2 Section 14.2.12.1. However, no preoperational test specifications were found to confirm adequate performance of the turbine generator and auxiliaries; turbine-generator control system; mechanical, electrical and manual trip functions; indication, annunciation and controls; and fail-safe response. Also, no provisions for assessing the performance of diagnostic routines were included. Consequently, the DCD should be revised to include preoperational test specifications that are appropriate and sufficient for confirming acceptable performance in this regard.
- 4) Tier 2 Section 14.2.12.2 establishes test specifications for power ascension testing. However, no power ascension test specifications were found to confirm adequate performance of the steam and power conversion systems, including turbine generator and related valve and system response, indication, and annunciation (such as during design-basis load and speed control evolutions and

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maneuvering operations). Note that while Tier 2 Test 14.2.12.2.4.16 evaluates nuclear plant performance during load swings, it does not include prerequisites (such as controls in automatic) and specific monitoring and acceptance criteria for assessing performance of the steam and power conversion systems during steady-state, load follow, and transient conditions. Consequently, the DCD should be revised to include power ascension test specifications that are appropriate and sufficient for confirming acceptable performance of the steam and power conversion systems in this regard.

- 5) Tier 2 Test 14.2.12.2.4.19 performs a 100% load rejection test. However, the test is inadequate in that the prerequisites do not ensure that the emergency turbine overspeed trip systems (mechanical, electrical, and manual) are fully functional and operating in automatic, and that the manual trip locations are manned. Also, the objective to demonstrate satisfactory plant transient response (including acceptable performance of the turbine generator and related systems, indication, and annunciation) has not been addressed by the test specification. For example, specific plant performance considerations and corresponding acceptance criteria have not been established for assessing plant performance. Consequently, the DCD should be revised to include test specifications that are appropriate and sufficient for demonstrating acceptable plant performance during the 100% load rejection test.

6) It isn't clear what combination of test specifications listed in Tier 2 Section 14.2 are intended to test the turbine generator control and overspeed protection systems in their entirety, including performance of all components, diagnostic routines, and failure modes. Additional information is needed to identify the specific test specifications that are credited in this regard. Also, test specifications should better describe the parameters and data to be monitored and recorded in order to assess performance, and corresponding acceptance criteria should be better described as well. The test specifications that were reviewed appeared to be much too vague in this regard and more specificity should be provided.