
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

1/31/2013

**US-APWR Design Certification
Mitsubishi Heavy Industries
Docket No. 52-021**

RAI NO.: NO. 850-6002 REVISION 3
SRP SECTION: 03.07.01 – Seismic Design Parameters
APPLICATION SECTION: 3.7.1
DATE OF RAI ISSUE: 10/21/11

QUESTION NO. RAI 03.07.01-25:

In Subsection 4.1 of MUAP-10001(R3), "CSDRS Compatible Ground Motion Time Histories," Item 2 of the first paragraph on Page 4-4 states:

- "a. Run RSPMatch to simultaneously match the target for the five damping ratios defined in the target and multiple iterations.
- b. Apply baseline correction to the matched time history motion.
- c. Rerun RSPMatch to match only the 5% damped spectral target, only with a single iteration.
- d. Apply baseline correction to that time history motion."

It is a general engineering practice that the spectrum from the artificial ground motion time history must envelop the free-field design response spectra for all damping values used in the seismic response analysis. The applicant is requested to clarify whether the time history obtained from step c stated above will simultaneously match the target spectra for the five damping ratios. The Applicant is also requested to provide graphical plots for the comparisons and to provide rationale for why step c is needed once step a is done.

ANSWER:

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-11417 (ML11339A013).

Technical Report MUAP-10001, Rev. 3 has been superseded and its relevant information has been incorporated into Technical Report MUAP-10006, Rev. 3. The methodology of SRP 3.7.1 Option 1, Approach 1 is now used for development of time history ground motion compatible with the certified seismic design response spectra (CSDRS) of the US-APWR standard plant, as described in Sections 01.3.1, 01.4.1 and 01.5.1 of Technical Report MUAP-10006, Rev. 3. Instead of using the RSPMatch code, which employs wavelets to modify the seed recorded time histories, Fourier amplitudes from numerical integration of the seed recorded time histories were modified in an iterative process until their response spectra envelop the CSDRS for damping values (2%, 3%, 5%, 7%, and 10%) and their power spectral densities (PSDs) envelop US-APWR target PSDs. Therefore the four steps listed above are no

longer presented because they no longer reflect the process to develop the design-basis time histories.

The process for development of the time histories, including the iterations and baseline correction to the input motion, is described in Section 01.4.1.3 of Technical Report MUAP-10006, Rev. 3. Technical Report MUAP-10006, Rev. 3, Figures 01.5.1.2-4 through 01.5.1.2-6 graphically demonstrate that the response spectra derived from the design-basis time histories envelope the target CSDRS at 2%, 3%, 5%, 7%, and 10% damping values.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on S-COLA

There is no impact on the S-COLA.

Impact on PRA

There is no impact on the PRA.

Impact on Technical/Topical Report

There is no impact on the Technical/Topical Report.

This completes MHI's response to the NRC's question.