
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

02/27/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.: NO. 853-6029 REVISION 3
SRP SECTION: 03.07.02 – Seismic System Analysis
APPLICATION SECTION: 3.7.2
DATE OF RAI ISSUE: 10/24/2011

QUESTION NO. 03.07.02-144:

In the fourth paragraph of Section 4.0 of MUAP-11006 (R0) related to the CIS, the applicant states, "In addition, uniform 5% structural damping was assigned to the models for validation purposes." In numerous places in the report, the applicant states that validation is performed in ANSYS using full transient time history analysis. The staff understands that for full transient time history analysis, uniform structural damping is not an option available in ANSYS; rather globally applied mass proportional damping, and stiffness proportional damping (applied either globally or at the material level) is considered for such analysis. The applicant is requested to explain the damping formulation used in the validation and what effect it has on the validation results.

ANSWER:

A lumped mass stick model of the seismic category I structures is no longer used for the associated studies (Structure-Soil-Structure Interaction (SSSI) in Technical Report MUAP-11011 and embedment and water table in Technical Report MUAP-11007). Technical Report MUAP-11006 is withdrawn.

In the Soil-Structure Interaction (SSI) analysis of the Reactor Building (R/B) complex a lumped mass stick model is used for the Reactor Coolant System (RCS). The RCS lumped mass stick model is coupled to the Finite Element (FE) model used for the R/B complex structure. Details of the RCS lumped mass stick model are provided in Technical Report MUAP-10006, Rev 3, Section 02.5.1.2.

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 a Technical/Topical Report.

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