
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. 03.07.02-146:

In the second paragraph of Section 5.2 of MUAP-11006 (R0), the applicant states that, “For validation purposes, the lumped-mass stick model is separated into three parts: R/BFHA (including the common basemat), PCCV, and CIS. Static and dynamic analyses using ANSYS solvers are performed on each of the three components of the lumped-mass stick models by establishing fixed boundary conditions at the base of each structure, respectively. An identical set of fixed base analyses are also performed on the Dynamic FE models of the R/B, PCCV, and CIS. The results obtained from the Lumped Mass Stick Models and Dynamic FE models are compared to demonstrate the ability of Lumped Mass Stick Models to adequately capture the global dynamic behavior of the corresponding Dynamic FE models.”

The applicant is requested to clarify whether or not these validation analyses are performed separately for the R/B-FHA, PCCV, and CIS, or if they are performed simultaneously with the R/B-FHA, PCCV, and CIS active in the models at the same time. If three systems are analyzed separately, the applicant is requested to provide a justification for neglecting any potential dynamic interaction between the three components of the lumped-mass stick models. The applicant is also requested to provide the details as to how the R/B-FHA, PCCV, and CIS are evaluated separately in the detailed dynamic model; and how it is determined that the individual SSCs lead to the same responses in both the LMSM and detailed dynamic models.

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 Technical Report MUAP-11006 is withdrawn.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.