RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

1/31/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 856-6094 REVISION 3**
SRP SECTION:	**03.07.02 – Seismic System Analysis**
APPLICATION SECTION:	**3.7.2**
DATE OF RAI ISSUE:	**10/24/11**

QUESTION NO. RAI 03.07.02-175:

In Subsection 3.3.2 of MUAP-11011 (R0), "Coupled Dynamic SSSI Effect," the fifth paragraph (Page 29) states, "The results of the ACS SASSI analysis of R/B Complex dynamic FE model resting on a hard rock subgrade are used to illustrate the uncertainty in the calculated structural response that are due to the variations in the frequency content of the input acceleration time histories."

The applicant is requested to address the following comments concerning this paragraph quoted above:

1. The applicant is requested to verify that, indeed, the dynamic FE model of the R/B complex is used in the analysis, because in the second paragraph of this Subsection (3.3.2), the applicant indicates that the lumped-mass stick model is used for the R/B complex.

2. In the sentence quoted above, the applicant indicates that the results of ACS SASSI analysis of R/B Complex are used to illustrate the uncertainty in the calculated structural response that is due to the variations in the frequency content of the input acceleration time histories. The staff is not able to comprehend the significance and relevance of this information on the SSSI effect in the design basis of standard plant SSCs and the applicant is requested to clarify this issue.

ANSWER:

Technical Report MUAP-11011, Rev. 0 has been superseded and the relevant information on the structure-soil-structure interaction analysis methodology has been incorporated into Technical Report MUAP-10006, Rev. 3.

The reactor building (R/B) complex now consists of the R/B, prestressed concrete containment vessel (PCCV), containment internal structure (CIS), east and west power source buildings (PS/Bs), auxiliary building, and essential service water pipe chase (ESWPC) structurally integrated and supported on a common basemat. The R/B complex is dynamically analyzed

using a finite element (FE) model. Note that a lumped mass stick model of the reactor coolant loop (RCL) is coupled to the structural model to account for the mass and stiffness of that system. The structure-soil-structure (SSSI) analysis evaluates the influence of the Turbine Building (T/B) on the R/B complex. The T/B is also a FE model.

A SSSI analysis was performed as described in Subsections 03.3.3 and 03.3.4 of Technical Report MUAP-10006, Rev. 3. The SSSI analysis produced some instances where the results were higher than the soil-structure interaction results. As such, the design basis envelope for the US-APWR includes the SSSI results, which are incorporated into the seismic design. Therefore, the sentence quoted in the question above is not included in Technical Report MUAP-10006, Rev. 3.

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 Technical/Topical Report

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