RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

08/13/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 1045-7141 REVISION 3**
SRP SECTION:	**03.08.05 – Foundations**
APPLICATION SECTION:	**3.8.5**
DATE OF RAI ISSUE:	**07/08/2013**

QUESTION NO. 03.08.05-53:

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide updated information related to a seismic design change.

In Subsection 3.8.5.4.2.1, "Global Three-Dimensional FE [finite element] Modeling of Basemat," the fourth paragraph (Page 3.8-99) states, "The R/B [reactor building] complex basemat is simulated with solid elements (ANSYS SOLID45 elements) that are defined by eight nodes having three degrees of freedom at each node, translations in the nodal x, y, and z directions."

The staff does not believe that the ANSYS SOLID45 element calculates the bending moment and shear forces for the R/B complex basemat. Therefore, the applicant is requested to provide information on how the bending moment and shear forces are calculated based on the stress outputs of the ANSYS SOLID45 element for designing the basemat.

ANSWER:

The ANSYS SOLID45 element nodes have only translational degrees of freedom and do not have rotational degrees of freedom. Therefore, bending moments cannot be obtained directly from SOLID45 elements.

To capture the complete structural behavior of the basemat foundation, design sections cut through the whole depth of basemat with multiple layers of SOLID45 elements are defined. The ANSYS "FSUM" command is used to obtain resultant forces and bending moments of these selected design sections. Therefore, all force components, including bending moments and shear forces, are available to evaluate defined basemat design sections.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-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.