RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

1/31/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 212-1950 REVISION 1**
SRP SECTION:	**03.07.02 - SEISMIC SYSTEM ANALYSIS**
APPLICATION SECTION:	**3.7.2**
DATE OF RAI ISSUE:	**02/25/09**

QUESTION NO. RAI 03.07.02-01 (03.07.02-27):

In Section 3.7.2.11 of the DCD, clarify the second bulleted item. It seems to state that the eccentricities between the mass centers and centers of rigidities for each floor are included to account for accidental torsion. However, the methodology is consistent with determining the torsional effects due to the known asymmetries in the distribution of mass and stiffness of the building rather than accidental torsion as implied in the DCD.

ANSWER:

This answer revises and replaces the previous MHI answer that was transmitted by letter UAP-HF-09188 (ML091320443).

The finite element (FE) model used for the dynamic analysis of the reactor building (R/B) complex has an adequate number of discrete mass degrees of freedom to capture the global and local translational, rocking, and torsional responses of the structures. This is discussed in Section 02.4.1.1.2 of Technical Report MUAP-10006, Rev. 3. The analysis and design of the US-APWR standard plant consider torsional effects in accordance with the recommendations outlined in Acceptance Criterion II.11 of SRP 3.7.2. DCD Section 3.7.2.11 has been revised to clarify how accidental torsion is accounted for, as described further below.

The torsional effects in a building structure can come from two parts. First, torsional effects are due to the general layout of the building, which cause eccentricities between the center of mass and center of rigidities, and these eccentricities vary from floor elevation to floor elevation. These eccentricities cause inertial torsional effects, which are considered by performing a dynamic analysis that incorporates the torsional degrees of freedom. Secondly, torsional effects are due to consideration of accidental torsion, where an additional eccentricity of +/- 5 percent of the maximum building dimension is used for both horizontal directions. The use of the additional eccentricity in the structural design accounts for torsional effects that are not captured in the seismic response analyses, such as torsion due to incoherency (spatial variation) of the input ground motion, non-vertically propagating incident waves, and/or accidental eccentricities. The effects of responses from inertial torsion and accidental torsion are combined in the building structural designs.

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the COLA**.**

Impact on S-COLA

There is no impact on the 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.