

REQUEST FOR ADDITIONAL INFORMATION 817-5990 REVISION 3

8/25/2011

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.03.02 - Tornado Loads

Application Section: DCD 3.3.2

QUESTIONS for Structural Engineering Branch 1 (AP1000/EPR Projects) (SEB1)

03.03.02-5

1. RAI Text

The US-APWR applicant is requested to provide the rationale used to determine that ASCE/SEI 7-05, Section 6.5.1, Method 2, Condition 2 is satisfied for the PCCV and the R/B, and that ASCE/SEI 7-05, Section 6.4.1.1, Method 1, Condition 6 is satisfied for the PS/Bs at any site where a nuclear power plant may be located. The applicant is also requested to identify the responsibilities of the COL applicant for the actions that the COL applicant needs to take to verify that ASCE/SEI 7-05, Section 6.5.1, Method 2, Condition 2 is satisfied for the PCCV and the R/B, and that ASCE/SEI 7-05, Section 6.4.1.1, Method 1, Condition 6 is satisfied for the PS/Bs based on site-specific conditions for these structures.

2. Concern

US-APWR DCD Sec. 3.3.2, Revision 3 includes the following text.

Specific descriptions of wind load design method and importance factor for US-APWR standard structures are as follows.

- The US-APWR PCCV has a relatively low profile (overall height-to-diameter ratio of approximately 1.5), and the PCCV is surrounded by the rectangular-shaped R/B such that approximately only the upper half of the PCCV is exposed to wind loading. The PCCV does not have response characteristics which make it subject to across wind loading, vortex shedding, or other unusual wind effects which might require investigation using method 3 (wind tunnel procedure) of ASCE/SEI 7-05. Further, the site location of the PCCV is such that channeling or buffeting effects do not warrant special consideration. Therefore, the PCCV is also analyzed using method 2 of ASCE/SEI 7-05.
- The R/B (seismic category I), the A/B (seismic category II), and the T/B (seismic category II) are analyzed using method 2 and an importance factor of 1.15.
- The US-APWR east and west PS/Bs (seismic category I) and the AC/B (nonseismic) are low-rise, simple rigid diaphragm buildings which conform to the requirements of ASCE/SEI 7-05 Subsections 6.4.1.1 and 6.4.1.2. Therefore, these buildings have been analyzed using method 1 of ASCE/SEI 7-05 (Reference 3.3-1).

According to ASCE/SEI 7-05, Section 6.5.1, Method 2 can only be used if the building or other structure meets the following condition.

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2. The building or other structure does not have response characteristics making it subject to across wind loading, vortex shedding, instability due to galloping or flutter; or does not have a site location for which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.

Similarly, according to ASCE/SEI 7-05, Section 6.4.1.1, Method 1 can only be used if the building meets the following condition.

6. The building or other structure does not have response characteristics making it subject to across wind loading, vortex shedding, instability due to galloping or flutter; or does not have a site location for which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.

Accordingly, in order for the ASCE SEI 7-05 methods to be applicable as committed, the COL applicant is requested to verify that the PCCV, R/B, and PS/Bs do not have site locations for which channeling effects or buffeting in the wake of upwind obstructions warrant special considerations. This COL action item should be included in Table 1.8-2 of the DCD.