

# REQUEST FOR ADDITIONAL INFORMATION 908-6327 REVISION 3

3/5/2012

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.03.02 - Tornado Loads

Application Section: DCD 3.3.2 - Tornado Loadings

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

03.03.02-6

Nuclear power plants must be designed so that they remain in a safe condition under extreme meteorological events, including the most extreme wind events (tornadoes and hurricanes) that could reasonably be predicted to occur at the site. This requirement is based on the following regulations:

- 10 CFR Part 50, Appendix A, GDC 2 requires that SSCs important to safety shall be designed to withstand the effects of natural phenomena such as tornadoes and hurricanes with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated without loss of capability to perform their safety functions.
- 10 CFR Part 50, Appendix A, GDC 4 requires that SSCs that are important to safety be appropriately protected against the effects of missiles that may result from events and conditions outside the nuclear power unit.
- 10 CFR 100.20(c)(2) states that the meteorological characteristics of the site that are necessary for safety analysis or that may have an impact upon plant design must be identified and characterized
- 10 CFR 100.21(d) states, in part, that the meteorological characteristics of the site must be evaluated and site parameters established such that potential threats from such physical characteristics will pose no undue risk to the type of facility proposed to be located at the site.

Initially, the U.S. Atomic Energy Commission (predecessor to the NRC) considered tornadoes to be the bounding extreme wind events and issued RG 1.76, "Design-Basis Tornado for Nuclear Power Plants," in April 1974. In March 2007, the NRC issued Revision 1 of RG 1.76, "Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants," which is based on the Enhanced Fujita Scale implemented by the National Weather Service in February 2007. The Enhanced Fujita Scale is an indirect assessment relating tornado damage to wind speed, which resulted in a decrease in design-basis tornado wind speed criteria in Revision 1 of RG 1.76. Since design-basis tornado wind speeds were decreased, it was no longer certain that the reduced tornado design basis wind speeds would bound design-basis hurricane wind speeds in all areas

## **REQUEST FOR ADDITIONAL INFORMATION 908-6327 REVISION 3**

of the United States. This resulted in issuing a new RG 1.221, "Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants," in October 2011.

In consideration of the guidance provided in RG 1.221, the applicant is requested to define the design-basis hurricane windspeeds and hurricane produced missile speeds in cases where hurricane, not tornado, is bounding for the extreme wind. Furthermore, methodology should be given on the conversion of hurricane wind and missile impact effects to design load, and on the determination of total wind load effects from the combination of hurricane wind effects and missile impact effects. The applicant is also requested to revise COL Information items in Sec. 3.3.3 and Table 1.8-2 of the DCD, taking into account the hurricane effects, should it bound the extreme wind conditions.