**REQUEST FOR ADDITIONAL INFORMATION NO. 154-1643 REVISION 0**

1/12/2009

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 03.05.01.04 - Missiles Generated by Tornadoes and Extreme Winds
Application Section: 3.5.1.4 - Missiles Generated By Tornadoes and Extreme Winds

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

03.05.01.04-1

**RAI 3.5.1.4-01**

**In DCD Tier 2, Revision 1, Section 3.3.2.1 Mitsubishi provided the following parameters as design basis tornado parameters for the US-APWR design:**

- **Maximum wind speed of 370 km/h (230 mph)**
- **Maximum rotational speed of 296 km/h (184 mph)**
- **Maximum translational speed of 74 km/h (46 mph)**
- **Radius of maximum rotational speed of 45.7m (150 ft)**
- **Atmospheric pressure drop of 8.3 kPa (1.2 psi)**
- **Rate of pressure drop of 3.4 kPa/s (0.5 psi/s)**
- **Exceedance frequency of 1 x $10^{-7}$ per year**

**However, the staff finds that not all the above design basis tornado parameters are included in DCD Tier 1, Revision 1, Table 2.1-1, "Key Site Parameters." Therefore, revise DCD Tier 1, Revision 1, Table 2.1-1 to include maximum rotational speed of 296 km/h (184 mph), maximum translational speed of 74 km/h (46 mph), radius of maximum rotational speed of 45.7m (150 ft), rate of pressure drop of 3.4 kPa/s (0.5 psi/s), and exceedance frequency of 1 x $10^{-7}$ per year. Include this information in the DCD and provide a markup in your response.**

**RAI 3.5.1.4-02**

**The design basis tornado parameters and tornado-generated missile spectra provided In DCD Tier 2, Revision 1, Section 3.3.2.1 and Table 2.0-1, respectively are consistent with the guidance as described in RG 1.76 for Region 1.**

**RG 1.76 only applies to the continental United States, which is divided into three regions (the central portion of the United States; a large region of the United States along the east coast, the northern border, and western Great Plains; and the western United States). Revise DCD Tier 2, Revision 1, Table 1.8.2, "Compilation of All Combined License Applicant Items for Chapters 1-19," and Section 3.5.4 to include a COL information item that requires a COL applicant that references the US-APWR design certification for a site located outside the continental United States to confirm that the design basis tornado parameters are**

**within those specified for the US-APWR design. Include this information in the DCD and provide a markup in your response.**

**RAI 3.5.1.4-03**

**In DCD Tier 2, Revision 1, Section 3.5.1.4 Mitsubishi states that because of the higher wind speed and the resulting higher kinetic energy, the design for wind-generated missiles is governed by tornado missiles and not hurricane missiles. Therefore, US-APWR seismic category I and II structures are not designed for hurricane missiles, because the design for tornado missiles envelopes the design for hurricane missiles. The staff does not concur with Mitsubishi that the design for tornado missiles will envelope the design for hurricane missiles**

**RG 1.76 does not address extreme winds such as hurricanes, or the missiles attributed to such winds. RG 1.76 states that tornado wind speeds may not bound hurricane wind speeds for certain portions of the Atlantic and Gulf coasts, at the wind speed frequencies of occurrence considered in this guide. Therefore, revise DCD Tier 2, Revision 1, Table 1.8.2 and Section 3.5.4 to include a COL information item that requires a COL applicant that references the US-APWR design certification for a site located in certain portions of the Atlantic and Gulf coasts to confirm that tornado wind speeds bound hurricane wind speeds for that portions of the Atlantic and Gulf coasts, at the wind speed frequencies of occurrence considered in RG 1.76. Include this information in the DCD and provide a markup in your response.**

**RAI 3.5.1.4-04**

**In DCD Tier 2 Section 3.3.2.1 Revision 1, Mitsubishi states that for the design basis tornado the annual exceedance probability tornado is above $10^{7}$ while SRP Section 3.5.1.4, Revision 3 states that evolutionary reactors should be designed based on a design basis tornado strike probability of $10^{-7}$ per year as defined in RG 1.76.**

**The staff believes that the above cited discrepancy between DCD Tier 2 Section 3.3.2.1 Revision 1 and SRP Section 3.5.1.4, Revision 3 is due to typo error. Therefore, revise the DCD to clarify this typo error.**

**Also, revise DCD Tier 2, Revision 1, Table 1.8.2, "Compilation of All Combined License Applicant Items for Chapters 1-19," to include a COL information item to require the COL applicant that references the US-APWR design certification to confirm that the probable occurrence of the site proximity missile (except aircraft) is less than $1x10^{-7}$ per year based on the site-specific information in accordance with SRP Section 3.5.1.5. Include this information in the DCD and provide a markup in your response.**

**RAI 3.5.1.4-05**

**In the US-APWR design basis tornado parameters, automobile missiles are considered to impact at an altitude of less than 9.1 m (30 ft) above plant grade. Therefore, for sites with surrounding ground elevations higher than plant grade, a**

**COL applicant that references the US-APWR design certification should confirm that automobile missiles cannot be generated within a 0.5 mile radius of safety-related SSCs that would lead to impact higher than 30 ft above plant grade.**

**Revise DCD Tier 2, Revision 1, Table 1.8.2, to include a COL information item to require the COL applicant that references the US-APWR design certification to confirm that automobile missiles cannot be generated within a 0.5 mile radius of safety-related SSCs that would lead to impact higher than 30 ft above plant grade. Include this information in the DCD and provide a markup in your response.**.