

Enclosure 2

MFN 14-075 Supplement 2

GEH Supplemental Response #2 to RAI 02-1

ABWR DCD Revision 5 Markups

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Insert Extreme Wind as section title:
Indent Tornado and Hurricane under it.

Change "Extreme Wind" to "Severe Wind"

Table 5.0 ABWR Site Parameters

<p>Maximum Ground Water Level: 61.0 cm below grade</p> <p>Maximum Flood (or Tsunami) Level: 30.5 cm below grade</p> <p>Precipitation (for Roof Design):</p> <ul style="list-style-type: none"> • Maximum rainfall rate: 49.3 cm/h⁽³⁾ • Maximum snow load: 2.394 kPa <p>Ambient Design Temperature:</p> <p>1% Exceedance Values</p> <ul style="list-style-type: none"> • Maximum: 37.8°C dry bulb 25°C wet bulb (coincident) 26.7°C wet bulb (non-coincident) • Minimum: -23.3°C- <p>0% Exceedance Values (Historical Limit)</p> <ul style="list-style-type: none"> • Maximum: 46.1°C dry bulb 26.7°C wet bulb (coincident) 27.2°C wet bulb (non-coincident) • Minimum: -40°C <p>Exclusion Area Boundary (EAB): An area whose boundary has a Chi/Q less than or equal to $1.37 \times 10^{-3} \text{ s/m}^3$.</p>	<p>Extreme Wind: Basic Wind Speed: 177 km/h⁽¹⁾/197 km/h⁽²⁾</p> <p>Tornado</p> <ul style="list-style-type: none"> • Maximum tornado wind speed: 483 km/h • Maximum pressure drop: 13.827 kPaD • Missile spectra: Spectrum I⁽⁴⁾ <p>Hurricane</p> <ul style="list-style-type: none"> • <u>Maximum hurricane wind speed⁽⁸⁾</u>: 286.5 km/h • Maximum pressure drop: 0 kPaD • <u>Missile spectra:</u> Spectrum I⁽⁴⁾ <p>Soil Properties:</p> <ul style="list-style-type: none"> • Minimum static bearing capacity: a • Minimum shear wave velocity: 305 m/s⁽⁶⁾ • Liquefaction potential: None at plant site resulting from site specific SSE ground motion <p>Seismology:</p> <ul style="list-style-type: none"> • SSE response spectra: See Figures 5.0a and 5.0b⁽⁷⁾ <p>Meteorological Dispersion (Chi/Q):</p> <ul style="list-style-type: none"> • Maximum 2-hour 95% EAB: $1.37 \times 10^{-3} \text{ s/m}^3$ • Maximum 2-hour 95% LPZ: $4.11 \times 10^{-4} \text{ s/m}^3$ • Maximum annual average (8760 hour) LPZ: $1.17 \times 10^{-6} \text{ s/m}^3$
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Eliminate whole line

- (1) 50-year recurrence interval; value to be utilized for design of non-safety-related structures only.
- (2) 100-year recurrence interval; value to be utilized for design for safety-related structures only.
- (3) Maximum value for 1 hour over 2.6 km² probable maximum precipitation (PMP) with ratio of 5 minutes to 1 hour PMP of 0.32. Maximum short-term rate: 15.7cm/5 min.
- (4) Spectrum I missiles consist of a massive high kinetic energy missile which deforms on impact, a rigid missile to test penetration resistance, and a small rigid missile of a size sufficient to just pass through any openings in protective barriers. These missiles consists of an ~~4800~~1810 kg automobile, a ~~425~~130 kg, 20 cm diameter armor piercing artillery shell, and a 2.54 cm diameter solid steel sphere, all impacting at 35% of the maximum horizontal windspeed of the design basis tornado or 59% of the maximum horizontal wind speed of the design basis hurricane. The first two missiles are assumed to impact at normal incidence, the last to impinge upon barrier openings in the most damaging directions.
- (5) At foundation level of the reactor and control buildings.
- (6) This is the minimum shear wave velocity at low strains after the soil property uncertainties have been applied.
- (7) Free-field, at plant grade elevation.
- (8) Maximum hurricane wind speed is the nominal 3-second gust wind speed measured at 10 m above ground over open terrain.

Replace "Extreme Wind" by "Severe Wind"

Insert "Extreme Wind:" as title:
Indent Tornado and Hurricane as subtitles.

Table 2.0-1
Envelope of ABWR Standard Plant Site Design Parameters

Maximum Ground Water Level:	61.0 cm below grade
Extreme Wind:	Basic Wind Speed: 177 km/h* / 197 km/h†
Maximum Flood (or Tsunami) Level:‡	30.5 cm below grade
Tornado:	<ul style="list-style-type: none"> – Maximum Tornado Wind Speed: 483 km/h – Maximum Rotational Speed: 386 km/h – Translational Velocity: 97 km/h – Radius: 45.7m – Maximum Pressure Drop: 13.827 kPaD – Rate of Pressure Drop: 8.277 kPa/s – Missile Spectra: Spectrum I^f
Hurricane:	<ul style="list-style-type: none"> – <u>Maximum Hurricane Wind Speed^{**}:</u> <u>286.5 km/h</u> – <u>Maximum Rotational Speed:</u> <u>261.5 km/h</u> – <u>Translational Velocity:</u> <u>25 km/h</u> – <u>Radius:</u> <u>1500 m</u> – <u>Maximum Pressure Drop:</u> <u>0 kPaD</u> – <u>Missile Spectra:</u> <u>Spectrum I</u>
Precipitation (for Roof Design):	<ul style="list-style-type: none"> – Maximum Rainfall Rate: 49.3 cm/h^{**} – Maximum Snow Load: 2.394 kPa
Ambient Design Temperature:	<ul style="list-style-type: none"> 1% Exceedance Values <ul style="list-style-type: none"> – Maximum: 37.8°C dry bulb 25°C wet bulb (coincident) 26.7°C wet bulb (non-coincident) – Minimum: –23.3°C 0% Exceedance Values (Historical limit) <ul style="list-style-type: none"> – Maximum 46.1°C dry bulb 26.7°C wet bulb (coincident) 27.2°C wet bulb (non-coincident) – Minimum: –40°C
Soil Properties:	<ul style="list-style-type: none"> – Minimum Static Bearing Capacity: 718.20 kPa^{††} – Minimum Shear Wave Velocity: 305 m/s^{††} – Liquification Potential: None at plant site resulting from site specific SSE ground motion

Eliminate 4 lines

3.3 ~~Wind and Tornado Loadings~~ Severe Wind and Extreme Wind (Tornado and Hurricane) Loadings

ABWR Standard Plant structures which are Seismic Category I are designed for ~~tornado~~ and extreme wind phenomena.

severe

3.3.1 ~~Wind Loadings~~ Severe Wind Loads

3.3.1.1 Design Wind Velocity

Seismic Category I structures are designed to withstand a design wind velocity of 177 km/h with a recurrence interval of 50 years and 197 km/h with a recurrence interval of 100 years at an elevation of 10m above grade (see Subsection 3.3.3.1 and 3.3.3.3 for COL license information requirements).

3.3.1.2 Determination of Applied Forces

The design wind velocity is converted to velocity pressure ~~in accordance with Reference 3.3-1~~ using the formula:

given in Reference 3.3.1 which is consistent with that of ASCE/SEI 7-05

$$q_z = \frac{K_z K_d K_e K_g V^2 I}{1609}$$

where K_z = exposure coefficient which depends upon the type of exposure and height (z) above ground per Table 6 of Reference 3.3-1

I = The importance factor which depends on the type of structure; appropriate values of I are listed in Table 3.3-1

V = Design wind velocity with a recurrence interval of 50 years, in km/h, and

q_z = Velocity pressure in kPa

The design wind pressures and forces for buildings, components and cladding, and other structures at various heights above the ground are obtained, in accordance with Table 4 of Reference 3.3-1 by multiplying the velocity pressure by the appropriate pressure coefficients and gust factors. Gust factors are in accordance with Table 8 of Reference 3.3-1. Appropriate pressure coefficients are in accordance with Figures 2, 3a, 3b, 4, and Tables 9 and 11 through 16 of Reference 3.3-1. Reference 3.3-2 is used to obtain the effective wind pressures for cases which Reference 3.3-1 does not cover. Since the Seismic Category I structures are not slender or flexible, vortex-shedding analysis is not required and the above wind loading is applied as a static load.

Applied forces for the Reactor, Control and Radwaste Buildings are found in Appendices 3H.1, 3H.2 and 3H.3, respectively.

3.3.2 ~~Tornado Loadings~~ Extreme Wind Loads (Hurricanes and Tornadoes)

3.3.2.1 Applicable Design Basis Eliminate items 2, 3, and 4, and change item 5 to item 2.

Extreme wind Eliminate items 2, 3, and 4, and change item 5 to item 2. hurricane and design basis tornado.

The design basis hurricane is described by the following parameters:

- (1) A maximum hurricane wind speed of 286.5 km/h at a radius of 1500 m from the center of the hurricane.
- (2) ~~A maximum translational velocity of 25 km/h.~~
- ~~(3) A maximum tangential velocity of 261.5 km/h, based on the translational velocity of 25 km/h.~~
- ~~(4) A maximum atmospheric pressure drop of 0 kPa with a rate of the pressure change of 0 kPa/s.~~
- ~~(5) The spectrum of hurricane generated missile and their pertinent characteristics as given in Table 2.0-1.~~

The design basis tornado is described by the following parameters:

- (1) A maximum tornado wind speed of 483 km/h at a radius of 45.7m from the center of the tornado.
- (2) A maximum translational velocity of 97 km/h.
- (3) A maximum tangential velocity of 386 km/h, based on the translational velocity of 97 km/h.
- (4) A maximum atmospheric pressure drop of 13.8 kPa with a rate of the pressure change of 8.3 kPa/s.
- (5) The spectrum of tornado-generated missiles and their pertinent characteristics as given in Table 2.0-1.

See Subsection 3.3.3.2 for COL license information.

3.3.2.2 Determination of Forces on Structures

The procedures of transforming the tornado loading into effective loads and the distribution across the structures are in accordance with Reference 3.3-3. The procedure for transforming