SEB Issue List Regarding APR1400 DC FSAR 3.3 “Wind and Tornado Loadings”

Issue #1 (AI 3-78.1)

In DCD Section 3.3.1.2, the applicant states that the wind pressure is determined in accordance with equation (6-15), which is part of Method 2 - Analytical Procedure. The Analytical Procedure is described in ASCE/SEI 7-05, Section 6.5 to determine design wind loads. According to this procedure, Method 2 can only be used to design the MWFRS for buildings that satisfy the two conditions defined in ASCE/SEI 7- 05, Section 6.5.1. Condition 2 for Method 2, states that the building does not have response characteristics making it subject to across wind loading, vortex shedding, instability due to galloping or flutter; and does not have a site location from which channeling effects or buffeting in the wake of upwind obstructions warrant special consideration.

The staff requests the applicant to confirm whether vortex shedding was considered in the design. The applicant should either describe the applied analytical methodology and related wind parameters used or justify the basis of preclusion in the design and provide the supporting analysis.

Response

The features of the APR1400 seismic Category I and II structures are regular-shaped, low-rise, enclosed or partially enclosed, rigid (the fundamental natural frequency is higher than 1 Hz) buildings. Since all of the seismic Category I and II structures that are exposed to the wind meet the requirements in ASCE/SEI 7-05 Section 6.5.1, it was not necessary to include vortex-shedding in the design of seismic Category I and II structures.

For reference, Eurocode 1 (Annex E.1 of EN 1991-1-4, Reference 1) states that the effects of vortex shedding should be investigated when the slenderness ratio of the structure exceeds six (6). The slenderness ratio of the seismic Category I and II structures of the APR1400 do not exceed six (6).

However, if the slenderness ratio of a structure would have exceeded six (6), vortex shedding would not have been required if the criteria in Equation 3 were met. The variables to calculate the critical wind velocity for the bending vibration mode and the ovalling vibration mode are shown in Equation 1 and Equation 2, respectively.

$$v_{crit,i} = \frac{b \cdot n_{i,y}}{St} \qquad \text{Equation 1}$$

$$v_{crit,i} = \frac{b \cdot n_{i,0}}{2 \cdot St} \qquad \text{Equation 2}$$

Where, b : Outer diameter of the cylinder

$n_{i,0}$: Fundamental ovalling frequency, defined in Annex F.2 of Ref 1

$n_{i,y}$: Natural frequency of the flexural mode i of cross-wind vibration

St : Strouhal number for circular cross-sections, Table E.1 of Ref 1

If either of the critical wind velocities did not meet the requirements in the equation below, the effect of vortex shedding would have been incorporated into the design. Since the slenderness ratios were determined to be less than six (6), it was not necessary to evaluated vortex shedding any further.

$$v_{crit,i} > 1.25 \cdot v_m \qquad \text{Equation 3}$$

Where, $v_m(z)$: Mean wind velocity

Reference

1. CEN (2005), "Eurocode 1: Actions on structures – Part 1-4: General actions – Wind actions," EN 1991-1-4, European Committee for Standardization, April 2005.

Impact on DCD

There is no impact on the DCD

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specification.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Reports.

SEB Issue List Regarding APR1400 DC
FSAR 3.3 "Wind and Tornado Loadings"

Issue #2 (AI 3-78.2)

SRP acceptance criteria 3.3.1.II.3.C states that the design wind loads should be determined in accordance with sections 6.5.12 through 6.5.13 of ASCE/SEI 7-05 as applicable depending on the building classification (enclosed, partially enclosed, open, etc.).

DCD in Section 3.3.1.2 states that the wind pressure is determined in accordance with equation (6-15) and the wind pressures and forces on the surfaces of Seismic category I and II SSCs are determined based on one of the methods provided in ASCE/SEI 7-05. It's clear to the staff that the equation used for velocity pressure is (6-15), however, the applicant is requested to clarify which method(s) is used to determine the design wind loads.

Response

According to the requirements of ASCE/SEI 7-05 section 6.2 and the general arrangements of the structures, seismic Category I and II structures are classified as enclosed or partially enclosed structures. Therefore, the design wind loads are determined in accordance with equation (6-17) of ASCE/SEI 7-05.

Impact on DCD

DCD Tier 2 Section 3.3.1.2 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specification.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Reports.

~~The wind pressures and forces on the surfaces of seismic Category I and II SSCs are determined based on one of the methods provided in ASCE/SEI 7-05.~~

Wind forces on the surfaces of seismic Category I and II structures, which are classified as enclosed or partially enclosed structures, are determined in accordance with the equation (6-17) of ASCE/SEI 7-05(Reference 1).

All non-safety-related facilities subject to winds are designed using the same design wind speed and methodology applied to seismic Category I SSCs except the load combinations. A wind-loading-caused full or partial failure of seismic Category II SSCs adjacent to seismic Category I SSCs does not affect the ability of the seismic Category I SSCs to perform their intended safety functions. Otherwise, the seismic Category I SSCs are designed to maintain their integrity from the failure of seismic Category II SSCs.

The COL applicant is to demonstrate that the site-specific seismic Category II SSCs adjacent to seismic Category I SSCs are designed to meet the provisions described above (COL 3.3(2)).

3.3.2 Tornado Loadings

The APR1400 standard and site-specific plant is designed to protect SSCs listed in the Appendix to NRC Regulatory Guide (RG) 1.117 (Reference 2) from tornadoes and hurricanes. All seismic Category I and II SSCs subject to tornado and hurricane winds are designed to meet the acceptance criteria described in Section 3.8.

3.3.2.1 Applicable Design Parameters

As provided in Table 2.0-1, the design basis tornado parameters are the same as those of Region I and categorized in NRC RG 1.76 (Reference 3). The annual probability of exceedance of the design basis tornado described above is 10^{-7}, and the corresponding recurrence interval is approximately 10 million years.

The maximum wind speed of design basis hurricane is 116 m/s (260 mph) from the wind speed contour maps for hurricane-prone regions of the contiguous United States presented in NRC RG 1.221 (Reference 4). The annual probability of exceedance of the design basis hurricane is 10^{-7}. The wind speed is nominal 3-second peak gust at a height of 10 m (33 ft) in flat open terrain.

SEB Issue List Regarding APR1400 DC
FSAR 3.3 “Wind and Tornado Loadings”

Issue #3 (AI 3-78.3)

In DCD Section 3.3.2.2.4 “Combined Extreme Wind Effects,” the total extreme wind load (W_w), the hurricane load (260mph) is higher than the tornado load (230mph). The staff requests the applicant to confirm whether the load from tornado wind effect was considered.

Response

In calculating the total extreme wind load, the load from hurricane wind effects along with the load from an associated pressure drop due to a tornado is considered. A tornado wind load (230 mph) has not been considered because the design hurricane wind load (260 mph) is bounding.

Sections 3.4, 3.4.1.5, 3.8.1.3.2 and Tables 3.8-7, 3.8-10, 3.8A-10 will be revised to reflect hurricane/tornado wind loading as mentioned above. The DCD markup for sections 3.5.2 and 14.3.2.7 were provided in the response to RAI 88-8046 Question 03.05.02-2 (refer to KHNP submittal MKD/NW-15-0108L of August 28, 2015; ML15240A208).

Impact on DCD

Sections 3.4, 3.4.1.5, 3.8.1.3.2 and Tables 3.8-7, 3.8-10, 3.8A-10 will be revised as indicated in the attachment markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specification.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Reports.

3.4 Water Level (Flood) Design

All seismic Category I structures, systems, and components (SSCs) are designed to withstand the effects of flooding due to natural phenomena or onsite equipment failures without loss of the capability to perform their safety-related functions.

The potential causes of external flooding include probable maximum precipitation, potential dam failures, and high groundwater and outdoor tank failures, and extreme sea waves such as storm surges, seiches, tsunamis, high tides, etc., as described in Section 2.4.

This analysis includes a site description and elevations of safety-related structures and equipment; evaluations of penetrations in seismic Category I structures; and the effects of flooding due to postulated pipe failures, operation of fire protection systems, and failures of non-seismic and non-tornado protected tanks, vessels, and piping.

/hurricane

3.4.1 Flood Protection and Evaluation

3.4.1.1 Design Bases

The design basis flood level at the reactor site will be determined in accordance with NRC RG 1.59 (Reference 1) and ANSI/ANS 2.8 (Reference 2). Because the design basis flood level of the APR1400 standard design is at least 0.3 m (1 ft) below the plant grade as specified in Table 2.0-1, all safety-related SSCs located on the dry site as defined in NRC RG 1.102 (Reference 3) are protected from an external flood event.

The COL applicant is to provide site-specific information on protection measures for the design basis flood, as described in Subsection 2.4.10 (COL 3.4(1)).

All seismic Category I structures are designed to withstand the static and dynamic forces due to the maximum groundwater level, which is 0.61 m (2 ft) below the plant grade as provided in Table 2.0-1.

3.4.1.5 Evaluation of Internal Flooding

The internal flooding analysis demonstrates that plant nuclear safety functions are protected from the effects of internal flooding that are the result of a postulated failure or operation of the plant fire protection system. The safety-related SSCs that must be protected against an internal flood and flood conditions are described in Section 7.4. Potential flooding sources are as follows:

a. High- and moderate-energy piping failures

b. Full-circumferential ruptures in non-seismic moderate-energy piping

c. Postulated failures of non-seismic and non-tornado-protected tanks and vessels
/hurricane

d. Pump mechanical seal failures

e. Operation of the fire protection system

Criteria and assumptions described in Subsection 3.6.2 are used for the internal flooding analysis. Subsection 3.6.2 provides the criteria used to define break and crack locations and configurations for high- and moderate-energy piping failures.

For flooding analysis, the single worst-case piping rupture for non-seismically analyzed piping is assumed for each analyzed area. Also, only one break at a time is postulated for non-seismic Category I or II piping as the result of a seismic event in the internal flooding analysis. The discharge volume through the ruptured area is calculated in accordance with the formula given in ANSI/ANS 56.10-1987, Section 3 (Reference 4). The released steam flow rate is conservatively assumed to be completely condensed to result in a higher flood level.

The discharge flow rate from a high-energy line break is obtained by one of the following critical flow correlations.

a. Moody model for two-phase mixture and saturated steam conditions

k. Seismic load (E_s)

Loads generated by the SSE; only the actual dead loads and live loads are considered in evaluating seismic response forces.

l. Tornado load (W_t)

or hurricane

Tornado or hurricane loading including the effects of missile impact

m. Internal flooding (H_a)

Load resulting from internal flooding other than from pipe breaks

n. Accident pressure (P_a)

Design pressure load within the containment generated by the design basis accident, based on the calculated peak pressure with an appropriate margin

o. Accident temperature (T_a)

Thermal effects and loads generated by the design basis accident including operating temperature (T_o)

p. Pipe reaction (R_a)

Pipe reaction from thermal conditions generated by the design basis accident including pipe reaction at normal operating or shutdown conditions (R_o)

q. Pipe break load (R_r)

Local effects due to the design basis accident normally include all postulated high-energy system ruptures. These loads include an appropriate dynamic load factor to account for the dynamic nature of the load. This load category includes:

1) Pipe break reaction load (Y_r)

Table 3.8-7

Design Loads for Nuclear Island Category I Structures

or hurricane

Structures	Loadings kN/m^2 (psf)							Remarks
	Dead Load (D)	Live Load (L)	Rain and Wind (L and W)	Soil (L_g)	Fluid Pressure (L_h)	Tornado (W_t)	Temp.°F Min/Max (T_o)	
	*	*	*	*	*	*	*	Notes: 1, 2, 4, 6
Interior walls	1.0 (20)	16.8 (350)	N/A	N/A	-	N/A	-	Note 8
Exterior walls	0.5 (10)	16.8 (350)	-	-	-	-	-	Notes: 3, 7, 8
Roof slabs	-	2.4 (50) ~ 10.0 (200)	-	N/A	N/A	-	-	Notes: 3, 5, 9
Main floor at elevation 78 ft 0 in to 174 ft 0 in	-	10.0 (200) ~ 24.0 (500)	-	N/A	-	-	-	-
Basemat at elevation 55 ft 0 in	-	24.0 (500)	N/A		-	N/A	-	-
Cask loading and decontamination pit	-	52.7 (1,000)	N/A	N/A	-	N/A	-	-

(1) The masses of all structures are included in all load combinations as dead loads.

(2) All structures are designed for seismic loads.

(3) See Subsection 3.8.4.3 for design soil loads, including groundwater, thermal loads, wind loads, tornado loads, and added live load due to precipitation.

or hurricane

(4) Abnormal loads due to main steam and feedwater line breaks are considered.

(5) Loads for SG removal are considered at elevation 156 ft 0 in CVCS area.

(6) Extreme external temperatures are evaluated to determine temperatures to be combined with extreme internal temperatures.

(7) Soil surcharge load on exterior walls due to construction loads.

(8) Live load on shear wall in horizontal (out-of-plane) direction to account for attachment loads.

(9) Snow drifts are considered for live load on lower roofs.

Table 3.8-10

Acceptance Criteria for Overturning, Sliding, and Flotation

Load Combination	Minimum Factor of Safety		
	Overturning	Sliding	Flotation
D+He+W	1.5	1.5	-
D+He+E_s	1.1	1.1	-
D+He+W_t	1.1	1.1	-
D+H_s	-	-	1.1

D : Dead load

H_e : Static and dynamic lateral and vertical earth pressure including buoyant effect of normal design groundwater table level

H_s : Buoyant force of the design basis flood

W : Wind load

W_t: Tornado or hurricane load

E_s : Seismic load

Table 3.8A-14

Factor of Safety for Basemat Stability

Load Combination	Minimum Factor of Safety		
	Overturning	Sliding	Flotation
$D + H_e + W$	1.5	1.5	-
$D + H_e + E_s$	1.1	1.1	-
$D + H_e + W_t$	1.1	1.1	-
$D + H_s$	-	-	1.1

D = Dead load

He = Static and dynamic lateral and vertical earth pressure including buoyant effect of normal design groundwater level

Hs = Buoyant force of the design basis flood

W = Wind load

Wt = Tornado or hurricane load

Es = Safe shutdown earthquake

<u>SEB Issue List Regarding APR1400 DC FSAR 3.3 “Wind and Tornado Loadings”</u>

<u>Issue #4 (AI 3-78.4)</u>

In Section 3.3.2.2.3 “Tornado Pressure Drop,” the applicant states that vented or partially enclosed and enclosed buildings are designed to withstand the pressure drop while pressure drop effects are not considered in the interior of unvented structures. It is not clear to the staff how the loads for partially enclosed (vented structures) were determined due to atmospheric pressure change during the passage of a tornado. The applicant is requested to address whether or not venting was adopted as a way to reduce the atmospheric pressure change effect on the structure.

<u>Response</u>

All vented or partially enclosed buildings were designed to withstand pressure drop effects applying the same method as enclosed buildings assuming there is no venting.

Impact on DCD

There is no impact on the DCD

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specification.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Reports.

SEB Issue List Regarding APR1400 DC
FSAR 3.3 “Wind and Tornado Loadings”

Issue #5 (AI 3-78.5)

In DCD Section 3.3.2.3 “Effect of Failure of Structures or Components Not Designed for Extreme Wind Loads,” the applicant states that the non-safety-related SSCs not designed for extreme wind loads are evaluated and designed using one of the following methods:

a. Designing the SSCs with seismic Category II designation and adjacent to seismic Category I SSCs to wind, and tornado/hurricane loadings.

The staff requests the applicant to clarify this statement and describe the method(s) that will be used to design Seismic Category II Structures. Additionally, the applicant should describe how the methods will be implemented to ensure protection of the Seismic Category I structures.

Response

The structures that are seismic Category II and located adjacent to seismic Category I structures are designed using the same design wind speed and methodology that is applied to the seismic Category 1 structure as described in DCD Section 3.3. Therefore, seismic Category II structures do not need to be evaluated and designed using the other methods described in DCD Section 3.3.2.3. Since the reference to seismic Category II is unclear and not necessary in 3.3.2.3.a, it will be deleted from the method described.

Impact on DCD

DCD Tier 2 Section 3.3.2.3.a will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specification.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Reports.

The non-safety-related SSCs not designed for extreme wind loads are evaluated and designed using one of the following methods:

a. Designing the SSCs ~~with seismic Category II designation and~~ adjacent to seismic Category I SSCs to wind, and tornado/hurricane loadings

b. Investigating the effect of adjacent structural failure on seismic Category I SSCs to provide reasonable assurance that the ability of the seismic Category I SSCs to perform their intended safety functions is not impacted or affected

c. Designing and providing a structural barrier to protect seismic Category I SSCs from adjacent structural failure

The COL applicant is to provide reasonable assurance that site-specific structures and components not designed for extreme wind loads do not impact either the function or integrity of adjacent seismic Category I SSCs (COL 3.3(3)).

3.3.3 Combined License Information

COL 3.3(1) The COL applicant is to demonstrate that the site-specific design wind speed is bounded by the design wind speed of 64.8 m/s (145 mph).

COL 3.3(2) The COL applicant is to demonstrate that the site-specific seismic Category II structures adjacent to the seismic Category I structures are designed to meet the provisions described in Subsection 3.3.1.2.

COL 3.3(3) The COL applicant is to provide reasonable assurance that site-specific structures and components not designed for the extreme wind loads do not impact either the function or integrity of adjacent seismic Category I SSCs.

3.3.4 References

1. ASCE/SEI 7-05, “Minimum Design Loads for Buildings and Other Structures,” American Society of Civil Engineers/Structural Engineering Institute, 2006.

SEB Issue List Regarding APR1400 DC
FSAR 3.3 "Wind and Tornado Loadings"

Issue #6 (AI 3-78.6)

In addition to the three (3) COL items listed in DCD Section 3.3.3 "Combined License Information," should the following site-specific issues also be addressed?

a. Demonstrate that the site-specific hurricane and tornado wind speed is bounded by the hurricane or tornado wind postulated for the certified design

b. Identify the responsibilities of the COL applicant for the actions to take if the site specific wind and tornado characteristics are not bounded by the site parameters postulated for the certified design

Response

The two COL items listed above for site-specific tornado and hurricane characteristics can be combined into one COL item. DCD Tier 2 Table 1.8-2, Sections 3.3.2.1 and 3.3.3 will be revised to incorporate the COL applicant's actions to determine if the site-specific hurricane and tornado wind speeds of the certified design are exceeded and if so, to perform an analysis using the postulated site parameters.

Impact on DCD

DCD Tier 2 Table 1.8-2, Sections 3.3.2.1 and 3.3.3 will be revised as indicated in the attached markup.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specification.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Reports.

Table 1.8-2 (2 of 29)

Item No.	Description
COL 2.5(1)	The COL applicant is to provide the site-specific information on geology, seismology, and geotechnical engineering as required in NRC RG 1.206.
COL 2.5(2)	The COL applicant is to confirm that the foundation input response spectra (FIRS) of the nuclear island are completely enveloped by the CSDRS-compatible free-field response motions at the bottom elevation of the nuclear island for a site with the low-strain shear wave velocity greater than 304.8 m/s (1,000 ft/s) at the finished grade in the free field. Alternately, the COL applicant is to confirm that FIRS of the nuclear island are completely enveloped by the CSDRS for a hard rock site with a low-strain shear wave velocity of supporting medium for the nuclear island greater than 2,804 m/s (9,200 ft/s).
COL 2.5(3)	The COL applicant is to confirm that the lower bound of the site-specific strain-compatible soil profile for a soil site is greater than the lower bound of the generic strain-compatible soil profiles used in the APR1400 seismic analyses.
COL 2.5(4)	The COL applicant is to confirm that the site-specific GMRS determined at the finished grade are completely enveloped by the hard rock high frequency (HRHF) response spectra for a site with a low-strain shear wave velocity of supporting medium for the nuclear island higher than 1,494 m/s (4,900 ft/s) overlaying a hard rock with a low-strain shear wave velocity greater than 2,804 m/s (9,200 ft/s).
COL 2.5(5)	The COL applicant is to perform a site-specific seismic analysis to generate in-structure response spectra at key locations using the procedure described in Appendix 3.7A if COL 2.5(2) and COL 2.5(3) above are not met. In addition, the COL applicant is to confirm that the site-specific in-structure response spectra so generated are enveloped by the corresponding in-structure response spectra provided in Appendix 3.7A.
COL 2.5(6)	The COL applicant is to perform a site-specific seismic response analysis using the procedure described in Appendix 3.7B and the EPRI White Paper, "Seismic Screening of Components Sensitive to High Frequency Vibratory Motions," if COL 2.5(4) is not met.
COL 2.5(7)	The COL applicant is to perform an evaluation of the subsurface conditions within the standard plant structure footprint based on the geologic investigation in accordance with NRC RG 1.132.
COL 2.5(8)	The COL applicant is to confirm that the dynamic properties of structural fill granular to be used in construction of the APR1400 seismic Category I structures satisfy the requirements of structural fill granular provided in Table 2.0-1.
COL 3.2(1)	The COL applicant is to identify the seismic classification of site-specific SSCs that should be designed to withstand the effects of the SSE.
COL 3.2(2)	The COL applicant is to identify the quality group classification of site-specific systems and components and their applicable codes and standards.
COL 3.3(1)	The COL applicant is to demonstrate that the site-specific design wind speed is bounded by the design wind speed of 64.8 m/s (145 mph).
COL 3.3(2)	The COL applicant is to demonstrate that the site-specific seismic Category II structures adjacent to the seismic Category I structures are designed to meet the provisions described in Subsection 3.3.1.2.
COL 3.3(3)	The COL applicant is to provide reasonable assurance that site-specific structures and components not designed for the extreme wind loads do not impact either the function or integrity of adjacent seismic Category I SSCs.

COL 3.3(4) The COL applicant is to perform an analysis if the site-specific wind and tornado/hurricane characteristics are not bounded by the site parameter postulated for the certified design.

The COL applicant is to perform an analysis if the site-specific wind and tornado/hurricane characteristics are not bounded by the site parameter postulated for the certified design (COL 3.3(4)).

The seismic Category I and II SSCs subject to extreme winds such as the design basis tornado or design basis hurricane are designed individually for the postulated extreme winds enveloping both the design basis tornado and design basis hurricane in terms of straight winds and wind-borne missiles. The pressure drop effects due only to the design basis tornado are combined with the design basis hurricane loadings, as described in Subsection 3.3.2.2.4.

3.3.2.2 Determination of Forces on Structures

The forces on seismic Category I and II SSCs due to the postulated extreme winds are obtained using methods outlined in Subsection 3.3.1.2. The missile barriers of the seismic Category I structures are designed based on the missiles listed in Table 3.5-2. The design method of missile barriers is presented in Subsection 3.5.3. The pressure drop effects due to the design basis tornado are determined using the guidance provided by Simiu and Scanlan (Reference 5). The loading combinations associated with the postulated extreme wind loadings are described in Tables 3.8-2, 3.8-9A, and 3.8-9B.

3.3.2.2.1 Hurricane Velocity Forces

Velocity forces due to the postulated extreme winds are determined using the approach described in Subsection 3.3.1.2 in conjunction with an importance factor (I) of 1.15 in accordance with SRP 3.3.2.

3.3.2.2.2 Hurricane Missile Effects

The missile barriers of seismic Category I structures are designed in accordance with the missile spectrum identified in Table 3.5-2. The missile barriers are designed to prevent the penetration, perforation, and withstand scabbing effects due to the hurricane missiles, as described in Subsection 3.5.3.

3.3.2.2.3 Tornado Pressure Drops

Pressure drop effects during the design basis tornado are evaluated based on the enclosure category of seismic Category I and II SSCs, as applicable. Vented or partially enclosed

The non-safety-related SSCs not designed for extreme wind loads are evaluated and designed using one of the following methods:

a. Designing the SSCs with seismic Category II designation and adjacent to seismic Category I SSCs to wind, and tornado/hurricane loadings

b. Investigating the effect of adjacent structural failure on seismic Category I SSCs to provide reasonable assurance that the ability of the seismic Category I SSCs to perform their intended safety functions is not impacted or affected

c. Designing and providing a structural barrier to protect seismic Category I SSCs from adjacent structural failure

The COL applicant is to provide reasonable assurance that site-specific structures and components not designed for extreme wind loads do not impact either the function or integrity of adjacent seismic Category I SSCs (COL 3.3(3)).

3.3.3 Combined License Information

COL 3.3(1) The COL applicant is to demonstrate that the site-specific design wind speed is bounded by the design wind speed of 64.8 m/s (145 mph).

COL 3.3(2) The COL applicant is to demonstrate that the site-specific seismic Category II structures adjacent to the seismic Category I structures are designed to meet the provisions described in Subsection 3.3.1.2.

COL 3.3(3) The COL applicant is to provide reasonable assurance that site-specific structures and components not designed for the extreme wind loads do not impact either the function or integrity of adjacent seismic Category I SSCs.

COL 3.3(4) The COL applicant is to perform an analysis if the site-specific wind and tornado/ hurricane characteristics are not bounded by the site parameter postulated for the certified design.

3.3.4 References

1. ASCE/SEI 7-05, “Minimum Design Loads for Buildings and Other Structures,” American Society of Civil Engineers/Structural Engineering Institute, 2006.