

Request for Additional Information No. 126 (944), Revision 0

10/31/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.03.02 - Tornado Loads
Application Section: EPR FSAR Section 3.3.2

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

03.03.02-1

1. In Section 3.3.2.2 (Determination of Tornado Forces on Structures) of the FSAR, the equation for wind pressure velocity uses a value of K_z and a value of I both equal to 1.0, while in the SRP the value of K_z is equal to .87 and the value of I is equal to 1.15. This results in a pressure load that is slightly lower than that provided in the SRP. Provide the basis for using different factors from those of the SRP and discuss their impact on the design of Seismic Category I structures.
2. Non safety-related structures must not adversely affect the ability of safety-related structures to perform their intended safety-related functions. In Section 3.3.2.3 (Effect of Failure of Structures or Components not Designed for Tornado Loads) of the FSAR, it states that the methodology of ASCE 58 is used to show that the NAB will not collapse under tornado loads. To review the basis for concluding that the NAB will not collapse, provide the methodology from ASCE 58 that was used for the NAB structural analysis.
3. In FSAR Section 3.3.2.3 (Effect of Failure of Structures or Components not Designed for Tornado Loads), it states that for the ACB and the TB 'one of the above methods' will be utilized to ensure that the adjacent Nuclear Island Basemat Structure is protected from the failure of the ACB or TB due to tornado loading. It is not clear what methods are being referenced and how they will be used to ensure that adjacent Nuclear Island Basemat Structures are protected from failure of the ACB or TB due to tornado loading. Specify and provide the method or methods that will be used and how they will be implemented to assure protection of Seismic Category I structures from ACB or TB failure.
4. Editorial comment-the acronyms for structures in Figure 3B-1 do not agree with the acronyms used in the text.
5. Acceptance Criteria 3 of SRP 3.8.3 endorsed that all loads combinations are to be in accordance with ACI 349. The reduction to 25% live load with tornado load as stated in FSAR Sections 3.3.2 (Tornado Loading) and 3.8.4.3.2 (Loading Combinations) contradict with ACI 349 and RG 1.143 Table 3 which use full live load instead of the 25 % live load noted above. Provide the bases of this live load reduction in combination with tornado load and justify this deviation from pertinent provisions of the SRP 3.8.3.

6. Referring to previous Item 3 above, discuss the effects of vortex shedding on the vent stack structural integrity with respect to tornado load.

03.03.02-2

1. In FSAR Section 3.3.2.2 it states that the exterior walls and roofs of Seismic Category I structures are designed for the maximum differential pressure of 1.2 psi and that when the pressure boundary is not established by exterior walls or roofs, the differential pressure is taken as zero. If there are any structures which are partially enclosed (vented) for which the pressure drop was assumed to be less than the full differential pressure drop, then according to SRP 3.3.2 the assumed pressure drop for these structures must be reviewed on a case-by-case basis. If there are such that fall into this category, provide the structure(s) and the basis for the assumed pressure drop.
2. In FSAR Section 3.3.2.3 it states that acceptance criteria for the vent stack include ASCE 43 (Limit State A) for overall stability and ACI 349 (Appendix B) for the anchorage of the vent stack to the stair tower roof slab. It is not clear from this description what loads are being applied to the vent stack including the basis for the tornado load. The applicant should provide the factors used for developing the tornado load, the basis for the loads used to design the anchorages and the margin of safety for the vent stack against its collapse on adjacent Seismic Category I structures.