ArevaEPRDCPEm Resource

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Sent: Friday, March 02, 2012 11:19 AM
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Subject: Draft - U.S. EPR Design Certification Application RAI No. 541 (6322), FSAR Ch. 2 - NEW PHASE 4 RAI
Attachments: Draft RAI_541_RSAC_6322.doc

Attached please find draft RAI No. 541 regarding your application for standard design certification of the U.S. EPR. If you have any question or need clarifications regarding this RAI, please let me know as soon as possible, I will have our technical Staff available to discuss them with you.

Please also review the RAI to ensure that we have not inadvertently included proprietary information. If there are any proprietary information, please let me know within the next ten days. If I do not hear from you within the next ten days, I will assume there are none and will make the draft RAI publicly available.

Thanks,
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Hearing Identifier: AREVA_EPR_DC_RAIs
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Request for Additional Information No. 541(6322), Revision 0

3/2/2012

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 02 - Site Characteristics and Site Parameters
Application Section: FSAR Tier 1, Section 5.0; FSAR Tier 2, Sections 2.0, 2.3, 3.2.2, 3.5.1.4, 3.5.3, 3.8.1, 3.8.3, 3.8.4, 3.8.5

QUESTIONS for Siting and Accident Conseq Branch (RSAC)

02-3

OPEN ITEM

New Phase 4 RAI

10 CFR 52.47(a)(1) states that the FSAR for an application for a standard design certification must contain the site parameters postulated for the design and an analysis and evaluation of the design in terms of those site parameters, where site parameters are defined in 10 CFR 52.2(a) as the postulated physical, environmental and demographic features of an assumed site. 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 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.

Nuclear power plants must be designed so that they remain in a safe condition under extreme meteorological events, including those that could result in the most extreme wind events (tornadoes and hurricanes) that could reasonably be predicted to occur 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. The design-basis tornado wind speeds were chosen so that the probability that a tornado exceeding the design basis would occur was on the order of 10^{-7} per year per nuclear power plant. In March 2007, the NRC issued Revision 1 of RG 1.76, ‘‘Design-Basis Tornado and Tornado Missiles for Nuclear Power Plants.” Revision 1 of RG 1.76 relied on the Enhanced Fujita Scale, which was implemented by the National Weather Service in February 2007. The Enhanced Fujita Scale is a revised 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 as a result of the analysis performed to update RG 1.76, it was no longer clear that the revised tornado design basis wind speeds would bound design-basis hurricane wind speeds in all areas of the United States. This prompted an investigation into extreme wind gusts during hurricanes and their relation to design basis hurricane wind speeds, which resulted in issuing RG 1.221, “Design-Basis Hurricane and Hurricane Missiles for Nuclear Power Plants,” in October 2011.

RG 1.221 also evaluated missile velocities associated with several types of missiles considered for different hurricane wind speeds. The hurricane missile analyses presented in RG 1.221 are based on missile aerodynamic and initial condition assumptions that are similar to those used for the analyses of tornado-borne missile velocities adopted for Revision 1 to RG 1.76. However, the assumed hurricane wind field differs from the assumed tornado wind field in that the hurricane wind field does not change spatially during the missile's flight time but does vary with height above the ground. Because the size of the hurricane zone with the highest winds is large relative to the size of the missile trajectory, the hurricane missile is subjected to the highest wind speeds throughout its trajectory. In contrast, the tornado wind field is smaller, so the tornado missile is subject to the strongest winds only at the beginning of its flight. This results in the same missile having a higher maximum velocity in a hurricane wind field than in a tornado wind field with the same maximum (3-second gust) wind speed.

Accordingly, the applicant is being requested to add hurricane wind speed and hurricane missile spectra to its list of site parameter values in Tier 1 and Tier 2 of the FSAR and show in Chapter 3 of Tier 2 of the FSAR how SSCs important to safety are protected from the combined effects of hurricane winds and missiles.