DRAFT

Request for Additional Information No. 8, Revision 0

5/8/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 19.01 - Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed
Application Section: 19.1.5.1
SEB2 Branch

QUESTIONS

19.01-1

DCD, rev.0, Section 19.1.5.1.1 provides the seismic risk evaluation using a PRA-based seismic margin approach (SMA). As described in Subsection 19.1.5.1.1.2, the SMA was conducted in accordance with the NRC guidance in SECY 93-087 and a review level earthquake (RLE) was defined at 1.67 times the design basis SSE. The staff considers the Design Basis SSE as the certified seismic design response spectra (CSDRS) which includes the ground motion acceleration across the entire frequency range of interest. The staff also considers that the RLE is defined to be 1.67 times the SSE. The staff requests that AREVA incorporate the above staff position in the SMA assessment.

19.01-2

The staff considers the RLE to be the earthquake level for which the HCLPF capacities of structures, systems, and components (SSC) are estimated. In the 2nd paragraph of Subseciton 19.1.5.1.1.2 of DCD, AREVA states “The RLE is the criterion to which the HCLPF values are compared”. The staff considers this interpretation to be inconsistent with SECY 93-087. The staff requests that AREVA revise this statement to reflect the staff position on the use of RLE in the determination of HCLPF capacities.

19.01-3

The staff believes that the HCLPF values should be estimated using the RLE for an SMA assessment.

The 5th paragraph of Subsection 19.1.5.1.1.2 of DCD stated that "... the median ground response spectrum is taken to be the median ground response spectrum from NUREG/CR-0098, anchored to 0.3g." The staff requests that the AREVA clarify its position on this issue.

19.01-4

The 1st paragraph of Subsection 19.1.5.1.1.3 of DCD states "The capacity of a component to maintain its function during and following strong ground motion and the uncertainties associated with that capacity were estimated on the basis of PGA." Since Subsection 19.1.5.1.1.2 already stated that the SMA assessment computes HCLPFs based on averaged spectral values in the frequencies between 2 to 10 Hz, the HCLPF statements made in subsequent sections should be consistent with that HCLPF statement. The staff requests that AREVA makes corrections in this subsection and other sections, if such inconsistency is identified.

19.01-5

DCD, rev 0, Section 19.1.5.1.1.4 describes accident sequences constructed for the SMA assessment. Event trees for at-power were provided for two initiating events: seismic induced loss of offsite power (S LOOP) and seismic induced small LOCA (S LOCA). Detailed delineation of these event trees were provided in Figures 19.1-10 and 19.1-11. S LOOP is typically considered in the seismic PRA due to its large contribution to CDF. However, it is not appropriate to include S LOOP in a SMA assessment, because of its lower seismic capacity (less than 0.1 g) and typically being assumed to fail for any seismic event and therefore, would not provide any useful insight in the plant HCLPF capacity (larger that a plant SSE). The staff requests that AVERA provide: 1) seismic induced initiating event categories such as structural failures, different sizes of LOCA, ATWS, vessel failure, etc., 2) associated event trees, and 3) fault trees logics for the systems appeared across the top of these event trees.

19.01-6

For the basic events (in terms of plant's SSCs) included in the fault trees, the staff requests that AREVA provide: 1) detailed description of methodology (ies) employed for obtaining the SSC's HCLPF capacities, 2) detailed description of HCLPF capacities for SSC if obtained through calculations, and 3) strategies for ensuring adequate as-built HCLPF capacities for those SSCs whose capacities were determined by means other than calculations.

19.01-7

DCD, rev 0, Section 19.1.5.1.1.5 states that “failures of structures which house safety-related systems were not added to the fault tree. These structures are expected to have high capacities, although their failures would also likely to cause core damage.” The staff considers that failures of Category I structures will lead directly to core damage. The staff requests that AREVA demonstrate in details that the structures housing safety systems possess the HCLPF capacity equal to 1.67 times CSDRS.

19.01-8

10 CFR 50.44 (c)(5) requires that an analysis, using an analytical technique acceptable to the staff, be performed to demonstrate the containment integrity to withstand internal pressurization from an accident that releases hydrogen generated from the 100 percent fuel clad-coolant reaction. Regulatory Guide (RG) 1.7, Revision 3, provides guidance for meeting the 10 CFR Part 50.44(c)(5) requirement for demonstrating the deterministic containment structural integrity. The staff requests that the applicant provide: 1) a discussion on how the 50.44(c)(5) requirement is met in DCD, rev 0, 2) the containment internal pressure and associated temperature time histories from an accident that releases hydrogen generated from the 100 percent fuel clad-coolant reaction, and 3) Service level C capacity for the containment and containment internals to withstand the induced pressure.

19.01-9

SECY-93-087 and the Commission’s Staff Requirement Memorandum (SRM) provided guidance for meeting the deterministic containment performance goal. The staff requests that the applicant provide: 1) a discussion on how the SECY-93-087 expectation is met in DCD, rev 0, 2) a discussion on the most likely severe accident challenges to the containment and the associated internal pressure and temperature time histories, 3) demonstration that Service level C capacity for the containment and containment internals is not exceeded, and 4) a discussion on the long term (beyond 24 hrs) strategy against the uncontrolled release of fission products.

19.01-10

Section 19.1.4.2.1.3 of DCD Tier 2 Revision 0 provides a high-level description of the containment pressure fragility development. However, an in-depth description and associated data are needed by the staff in its evaluation. The staff requests that the applicant provide: 1) a discussion to justify that the fragility was only developed for the temperature 170 C(338 F), 2) a discussion of the analytical process for estimating the median capacity and the composite logarithmic standard

deviation used to establish the fragility curve in Figure 19.1-8, 3) a discussion of the failure criteria and material limits based for the fragility development, 4) a discussion of the failure modes for the six failure locations identified in Table 19.1-21, 5) material data utilized in the fragility development.