DRAFT

Request for Additional Information No. 45, Revision 0

7/25/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: ser chapter 19
SPLB Branch

QUESTIONS

19-189

Zirconia is a very brittle material subject to failure by thermal shock as a result of the monoclinic-to-tetragonal phase change at about 1470 K.

a. Please demonstrate that the structural integrity of the Zirconia brick present in the cavity, the melt discharge channel, and the spreading compartment would be maintained in spite of the initial transient thermal loads that are expected following contact with molten core debris (i.e., following the molten core debris penetration of the 50 cm layer of siliceous, high iron-oxide content sacrificial concrete).

b. Discuss whether the Zirconia can be stabilized when materials such as MgO, CaO, and Y2O3 are produced during core debris-concrete interactions. In addition, address whether or not the exothermic dissolution of these materials has been evaluated as a possible contribution to the transient heat loads.

19-190

FSAR Section 19.2.6.4, on page 19.2-54, refers to Table 19.2-5 that lists SAMDA candidates already implemented in the U.S. EPR design. Specifically, SAMDA item CB-16, which has been implemented as part of the response to the guidance of SECY 93-087, is included in order to reduce or eliminate containment bypass leakage that could result from SGTR. On page 5-9, of Table 5-1, of the Environmental Report, (ANP-10290, Rev. 0) that supports the analysis presented in the FSAR, it is stated "the secondary side is cooled with feedwater supplied from the in-containment refueling water storage tank (IRWST)."

Please explain how this process is accomplished. Specifically, if this is already implemented, then it is important to evaluate whether this configuration could result in a new scenario for core damage with the potential for containment bypass.

19-191

In FSAR Section 19.2.4.4.5.4, Reactor Building Annuls, on page 19.2-47, it is stated "the annulus is designed against a maximum overpressure of 16 psia, which is limited by the

strength of the doors." Please clarify if the unit of "over-pressure" is meant to be "psia" or "psig".

19-192

The NRC Staff assumes that the technical basis for severe accident management for U. S. EPR plants will be provided by AREVA. As outlined in Section 19.2.5 of the FSAR, it appears that this guidance is being developed in the Operating Strategies for Severe Accidents (OSSA) project. The technical basis needs to be reviewed by the NRC staff before a COL is issued to ensure that the design-specific features for accident prevention and mitigation are appropriately considered, and that any potential issues or concerns are resolved before the applicable plant-specific procedures and training are developed.

1. Please discuss the various sequences considered, and the range of possible challenges to accident mitigation, in developing the OSSA diagnostic. Please provide the results of MAAP 4.0.7 analyses that support the development of the SAMGs. Please define the sets of high level and in-depth mitigation strategies to be used by the technical support center during a postulated severe accident. Please confirm the necessary associated instrumentation and elaborate on the actions presented in Table 19.2-4, based on the MAAP results and the mitigation strategies.

2. In Section 19.2.5 of the FSAR, it is stated that a COL applicant will review final plant-specific EOPs and SAMGs to confirm that the assumptions used in the PRA and severe accident analyses remain valid. However, Item No. 19.1-9 of Table 1.8-2 seems to indicate that this would be a COL holder item. Please clarify what is expected to occur and when it will be completed.