Request for Additional Information No. 142 (1623, 1630), Revision 0

11/26/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application FSAR Sections: 19.1.5 & 19.1.6.1

QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1 (AP1000/EPR Projects) (SPLA)

19-262

Follow-up to Question 19-50. Please revise the estimated EPR flooding frequencies in accordance with the statement on Page 19.1-115 of the EPR FSAR by including the potential flooding sources of valves, pumps, tanks/pools, and heat exchangers. Also, describe the process and references used to assign the equipment rupture frequencies. Otherwise, justify why the exclusion of these potential flooding sources in the analysis is conservative.

19-263

(Intentionally deleted)

19-264

FSAR, Page 19.1-117, last paragraph indicates that flooding scenarios are quantified using the same event tree logic used in the Level 1 internal events evaluation, however it doesn't specifically indicate the event trees. Thus, for each analyzed scenario, please identify the conditional event tree used to quantify the internal flooding CDF and provide the basis for selection.

19-265

In accordance with guidance provided in SRP Section 19.1.3.4, please explicitly describe the uses of EPR PRA-based seismic margins assessment and insights/assumptions in the design process to reduce the weaknesses/vulnerabilities, develop design requirements, and improve the EPR design safety profile.

19-266

The applicant refers to "transient-induced LOCA [loss-of-coolant accident]" on page 19.1-159 of the Final Safety Analysis Report (FSAR) and in the event tree for loss of the residual heat removal system (RHRS) in Appendix 19B of the FSAR. However, transient-induced LOCA is not defined. Revise the FSAR to describe the phenomenon to which this term refers (e.g., a stuck-open relief valve caused by the energy addition following a loss of RHRS).

19-267

(Follow-up to Question 19-131) The shutdown probabilistic risk assessment (PRA) assumes that plant operating state (POS) CAd and CBd are entered 8 hours and 44

hours following shutdown, respectively. The response to Question 19-131 acknowledges that, for a specific outage, entrances to different POS could occur earlier and therefore with higher decay heat loads. Before the shutdown schedule was extended by seven days per year to account for the assumed capacity factor (as discussed in the response to Question 19-19), what were the times of entry into POS CAd and CBd? Discuss whether the decay heat at these earlier POS entry times would be high enough to reduce the time available for any shutdown operator actions below the threshold allowed in the shutdown probabilistic risk assessment. Revise the FSAR as needed to ensure that this assumption about POS entry times is clearly identified and can be confirmed in the future.

19-268

(Follow-up to Question 19-166) Item 13 in Table 19.1-108, provided in response to Question 19-166, states that NUMARC 91-06 should be considered when developing plant-specific operations procedures. Given that NUMARC 91-06 provides only high-level risk management guidance and that more specific procedural actions are detailed in Generic Letter (GL) 88-17, discuss whether GL 88-17 should be added to item 13 of Table 19.1-108.

19-269

One of the acceptance criteria stated in Standard Review Plan (SRP) Section 19.0 is "that the applicant has used the PRA results and insights, including those from uncertainty analyses, importance analyses, and sensitivity studies, in an integrated fashion to identify and establish specifications and performance objectives (e.g., ITAAC [inspections, tests, analyses, and acceptance criteria], technical specifications [TS], RAP [reliability assurance program], RTNSS [regulatory treatment of non-safety systems], and COL [combined license] action items) for the design, construction, testing, inspection, and operation of the plant." Links between the PRA and the design process (FSAR Section 19.1.3.4), RAP (FSAR Section 19.1.7.4), development of PRA-based insights (FSAR Table 19.1-108), and development of COL items (FSAR Table 1.8-2) are specifically outlined. However, it is not clear how PRA results and insights were used to identify or establish any TS requirements. Therefore, the staff needs additional information to ensure the SRP acceptance criterion is met. Specifically:

a. Describe the process used to identify and establish TS requirements based on PRA results and insights (e.g., risk achievement worth (RAW) values), and revise the FSAR as appropriate to include this discussion. Include a discussion of how the process considers TS criterion 4, as presented in Title 10 of the Code of Federal Regulations (10 CFR) 50.36(c)(2)(ii)(D): "[a SSC] which operating experience or probabilistic risk assessment has shown to be significant to public health and safety."

b. In light of the response to part (a) above, justify the lack of TS requirements for the equipment for which sensitivity studies were performed in response to Question 19-176. This lack of TS requirements means that the shutdown risk profile of the U.S. EPR is largely dependent on voluntary actions (e.g., NUMARC 91-06 application) that could be withdrawn without NRC approval. If these design features were not available, the resulting risk profile is highly uncertain. Core damage frequency (CDF) and large release frequency (LRF) could increase by two or more orders of magnitude, and the impact on

the significant initiating events, sequences, and SSCs is unclear. The justification should address the impact of equipment unavailability on the results and insights of the PRA.

19-270

(Intentionally deleted)