ArevaEPRDCPEm Resource

From: Getachew Tesfaye
Sent: Wednesday, March 11, 2009 6:56 PM
To: 'usepr@areva.com'
Cc: Theresa Clark; Hanh Phan; Edward Fuller; Lynn Mrowca; John Rycyna; Joseph Colaccino; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 197 (2202), FSAR Ch. 19
Attachments: RAI_197_SPLA_2202.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on February 27, 2009, and discussed with your staff on March 11, 2009. No changes were made to the Draft RAI Questions as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 307

Mail Envelope Properties (C56E360E9D804F4B95BC673F886381E71D99A5C022)

Subject: U.S. EPR Design Certification Application RAI No. 197 (2202), FSAR Ch. 19
Sent Date: 3/11/2009 6:56:15 PM
Received Date: 3/11/2009 6:56:16 PM
From: Getachew Tesfaye

Created By: Getachew.Tesfaye@nrc.gov

Recipients:
"Theresa Clark" <Theresa.Clark@nrc.gov>
Tracking Status: None
"Hanh Phan" <Hanh.Phan@nrc.gov>
Tracking Status: None
"Edward Fuller" <Edward.Fuller@nrc.gov>
Tracking Status: None
"Lynn Mrowca" <Lynn.Mrowca@nrc.gov>
Tracking Status: None
"John Rycyna" <John.Rycyna@nrc.gov>
Tracking Status: None
"Joseph Colaccino" <Joseph.Colaccino@nrc.gov>
Tracking Status: None
"ArevaEPRDCPEm Resource" <ArevaEPRDCPEm.Resource@nrc.gov>
Tracking Status: None
"'usepr@areva.com'" <usepr@areva.com>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	773	3/11/2009 6:56:16 PM
RAI_197_SPLA_2202.doc	39930	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Request for Additional Information No. 197 (2202), Revision 0

03/11/2009

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: 19

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

19-274

(Follow-up to Question 19-39) The response to Question 10.04.09-1 describes a design change to maintain the emergency feedwater system (EFWS) supply header isolation valves closed during operation, but does not evaluate the effect of this change on the probabilistic risk assessment (PRA). The staff observes that the interconnection of the EFWS headers is implicit in the “EFW PBF” top event (described in the response to Question 19-39) and contributes to the relative importance of the EFWS tanks in the PRA. Evaluate the effect of the design change on the PRA results and insights and either incorporate it in the PRA or discuss it in Section 19.1.2.4 of the Final Safety Analysis Report (FSAR).

19-275

(Follow-up to Question 19-158) The new FSAR Section 19.1.6.3.1.4 provided with the response to Question 19-158 states that “the ability to close the hatch is credited” and that “the habitability of the containment (i.e., local temperature no higher than 122°F) is considered to be the most limiting criterion in determining the time available to close the hatch.” This assumption is inconsistent with the outage guidelines in NUMARC 91-06, guideline 4.1.1(3), and item 15 in FSAR Table 19.1-8, which state that containment should be closed prior to steaming. The staff requests additional information to clarify the containment closure assumptions.

a. In FSAR Section 19.1.6.3.1.4, document the time to core boiling for plant operating state (POS) CA and CB (based on the outage schedule assumed in the shutdown PRA).

b. Revise and document in the FSAR the probabilities of the operator failing to close containment based on the time available for closure prior to steaming inside containment.

19-276

(Follow-up to Question 19-158) The new FSAR Section 19.1.6.3.1.2 provided with the response to Question 19-158 states that “[t]he primary system is considered pressurized in states CA and CB”; however, FSAR Table 19.1-87 indicates that the reactor coolant

system (RCS) is vented in POS CB. The RCS vent could be large enough to preclude significant RCS re-pressurization given a complete loss of decay heat removal. Discuss the impact of the RCS vent in POS CB on the Level 2 shutdown analysis, and revise the PRA and/or FSAR as appropriate.

19-277

(Follow-up to Question 19-158) Revised FSAR Section 19.1.6.3.3.4, provided in response to Question 19-158, states that the passive autocatalytic recombiners (PAR) are used for control of hydrogen and oxygen following a severe accident at shutdown. FSAR Table 19.1-23 states that operation of the PARs is “implicitly assumed.” Discuss whether this assumption applies to the Level 2 shutdown PRA as well, or whether failures of the PARs are modeled. If the PARs are assumed not to fail, discuss the availability controls that ensure they will function when needed (e.g., not be disabled by a protective covering while maintenance is done in containment). As appropriate, include the importance of the PARs as a risk insight in the FSAR.

19-278

(Follow-up to Question 19-162) In response to Question 19-162, FSAR descriptions of emergency diesel generator (EDG) and station blackout diesel generator (SBODG) diversity were revised. The staff needs additional information related to this diversity assumption to conclude that the PRA treatment of the EDGs and SBODGs is appropriate. Specifically:

a. Since that response, additional Tier 1 information on the EDG bypass exhaust path has been added in response to Question 09.05.08-8. Discuss whether the SBODG has a similar bypass exhaust path and whether common-cause failures (CCF) of the exhaust paths can potentially occur.

b. FSAR Table 14.3-6, which lists PRA input to the development of inspections, tests, analyses, and acceptance criteria (ITAAC), states that “SBO DGs are independent and diverse from the EDGs.” However, the ITAAC in Table 2.5.3-2 of Tier 1 require only that the air start systems of the EDGs and SBODGs be independent. Discuss, given the general statement in Table 14.3-6, why only the air start system is addressed specifically, and revise the FSAR as appropriate.

19-279

(Follow-up to Question 19-247) The response to Question 19-247 estimates the amount by which core damage frequency (CDF) would decrease if the design change related to reactor coolant pump (RCP) thermal barrier cooling were incorporated in the U.S. EPR PRA. The sensitivity suggests that total CDF would decrease by 16 percent, largely driven by the fire and flood contribution, as a result of the design change. Therefore, while the change represents a decrease in overall risk, insights from the PRA may be affected. In response to Question 19-270, FSAR Section 19.1.2.4.1 was revised to state that, when a design change results in a cumulative impact of more than 10 percent on

total CDF or large release frequency (LRF), PRA insights are assessed to see if they remain valid. If the insights are no longer valid, the PRA is updated.

a. Discuss the expected effect of the design change on the PRA insights (such as those documented in Table 19.1-108 of the FSAR), as well as the input to the reliability assurance program (RAP) and the important operator actions provided to the developers of procedures, training, and other human-factors programs.

b. State the planned schedule for incorporating this design change in the PRA.

c. Discuss how this schedule relates to the planned schedule for implementing other programs (e.g., RAP, procedure development) that may be affected by the change.

19-280

(Follow-up to Question 19-248) The response to Question 19-248(d) justifies excluding the switchover to hot leg injection from the PRA, but only addresses boron precipitation. FSAR Section 6.3.2.8, as well as ANP-10299, “Applicability of AREVA NP Containment Response Evaluation Methodology to the U.S. EPR™ for Large Break LOCA Analysis,” Revision 0, state that hot leg injection is used to terminate core steaming. Justify the exclusion of this operator action with respect to termination of steaming. In addition, if the operator action (whether modeled in the PRA or not) is important to maintaining a low CDF and/or LRF, this risk insight should be included in the FSAR.

19-281

(Follow-up to Question 19-251) The response to Question 19-251 includes information necessary for the staff to conclude that shutdown-specific fire and flood initiating events do not pose a significant risk. As requested in Question 19-251, add a summary of this information to the FSAR.

19-282

(Follow-up to Question 19-251) The remote shutdown station (RSS) is only required to be operable during MODES 1, 2, and 3 per technical specification (TS) 3.3.3; however, the at-power PRA considers transfer to the RSS following a control room fire. State whether the assessment of internal fires during shutdown assumes that the RSS is available during shutdown. As appropriate, revise FSAR Table 19.1-109 to include this assumption. If applicable, discuss the administrative controls that will ensure the RSS remains available during shutdown.

19-283

(Follow-up to Question 19-254) In response to Question 19-254, FSAR Table 19.1-109 was revised to include part of the assumption about nozzle dams identified in the response to Question 19-174. However, the revision does not address other assumptions identified in Question 19-174, specifically:

a. Plant procedures that cover reduced inventory operation will govern the installation of nozzle dams and the establishment of adequate venting to prevent pressurization of the RPV upper plenum due to a postulated loss of decay heat removal.

b. Freeze seals are not expected to be used; they will not be part of the maintenance procedures for the U.S. EPR.

c. There are no other temporary reactor coolant system pressure boundaries as defined by NUREG-1449 and NUREG-1512.

Discuss why these assumptions were excluded from the revision to Table 19.1-109, and revise the FSAR as needed.