ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Thursday, January 06, 2011 9:48 PM
To: 'usepr@areva.com'
Cc: Pohida, Marie; Fuller, Edward; Phan, Hanh; Mrowca, Lynn; Ford, Tanya; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 460 (5153, 5302), FSAR Ch. 19, New Phase 4 RAI
Attachments: RAI_460_SPLA_CHPB_5153_5302.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on December 8, 2010, and on January 6, 2011, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. 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,
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Hearing Identifier: AREVA_EPR_DC_RAIs
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Request for Additional Information No. 460 (5153, 5302), Revision 0

1/6/2011

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)

19-348

Follow-up to RAI 257, Question 19-316(y)

The staff reviewed EPR's response to RAI 19-316(y). In this response, the applicant stated that the equipment hatch may not be closed in POS D. Therefore, EPR provided a sensitivity analysis of LERF in Function of Hatch Status in POS D, Table 316y. Hatch closure was assumed to be possible before boiling in case of a loss of the residual heat removal function with power available. The human error probability (HEP) was assumed to be .3. The staff also noted that with the hatch initially open in POS D, the resulting increase in total (at power and shutdown) LRF is 21%. Based on Table 316y, the shutdown and total LRF is sensitive to operator failure to close the equipment hatch and other open containment penetrations. In addition, the staff noted that in the EPR FSAR, Revision 2, Section 19.1.6.3.1.4, Equipment Hatch Closure (1) the initial closure actions are performed inside containment and (2) closure actions are credited up to when the local temperature is no higher than 122F. Since these assumptions contradict the staff guidance in Generic Letter 88-17 and industry guidance in NUMARC 91-06 the staff has the following questions and concerns:

a. Please document in Table 19.1-108 of the FSAR that the staff expeditious actions defined in Generic Letter 88-17 will be implemented prior to operating in a reduced inventory condition which provides the basis for the proposed shutdown rule as described in SECY 97-168 not being implemented.

b. In GL 88-17, It states, "…completion of containment closure may be delayed … This may be done on the basis of reliable temperature information obtained during a transient events provided the containment is closed prior to reaching an RCS temperature of 200F" as displayed by the larger of two valid indications of temperature at the top of the core or immediately above the core". Given this guidance, the staff does not accept credit for operators closing containment in containment harsh conditions that include: steam ejection from RCS openings, noise, fog, and elevated containment temperatures. The staff is requesting AREVA to reevaluate the shutdown level two analysis assuming hatch closure must be accomplished before RCS temperatures reach 200F.

c. Given the staff guidance in GL 88-17, the staff is requesting AREVA to remove the wording of Section 19.1.6.3.1.4 of the FSAR indicating that hatch closure is

credited until local temperatures reach 122F. The staff is requesting that this section of the FSAR is modified to be consistent with GL 88-17 and NUMARC 91-06 (e.g., to state that hatch closure was credited until RCS temperature reaches 212F).

d. In the FSAR, the staff is requesting AREVA to document the time to boiling in POS D, the time for hatch closure, and the justification for the human error probability that was used.

e. In the FSAR, the staff is requesting AREVA to describe what type of equipment is needed to perform hatch closure. The staff is requesting AREVA to document in the risk insights table (Table 19.1-108 in the US EPR FSAR) that the total LRF is sensitive to the operator's ability to close the containment equipment hatches and penetrations during Mode 5 and 6 before steaming inside containment."

19-349

Follow-up to RAI 257, Question 19- 317

The staff has reviewed the applicant's response to 19-317. In this response, the applicant states that there are no other RCS penetrations assumed to be open during POS CBD, other than the pressurizer degas valve lines and the nitrogen supply connection valves. Therefore, the RCS re-pressurization rate related to the timing of steaming inside containment and hatch closure are valid. The staff recognizes these assumptions are key risk insights that impact the total LRF results. Therefore, the staff is requesting the applicant to document in Table 19.1-108 of the US EPR FSAR that the EPR total LRF results are based on the pressurizer manway and other RCS penetrations being closed during POS CBD except for the pressurizer degas line valves and the nitrogen supply connection valves. This change represents a departure from how many operating PWR plants achieve reduced inventory operation.

19-350

Open Item

New Phase 4 RAI

FSAR Revision 2 Tier 2 Section 19.2.3.3.3.1 page 19.2-14 states: “Prior to core melt, the normally closed, de-energized motor operated isolation valves of the passive flooding lines will be manually opened by the operator.” In response to RAI No. 390, Supplement 6, Question 09.02.02-106, dated April 27, 2010, AREVA has proposed to add Figure 19.2-22 showing a P&ID for various operational modes of severe accident heat removal system to the FSAR Tier 2, Section 19.2. This figure shows the normally closed valves as 30JMQ42 AA0004 and 30JMQ42AA0006. (This figure is not provided in FSAR Tier 2 Revision 2, however a simplified version of this figure is in Section 2.3.3 of FSAR Tier 1, Revision 2 as Figure 2.3.3-1. Note that Table 2.3.3-1 in Tier 1 still refers to two valves in each line, and states that they would normally be open.) These valves are not identified to be supported by either the 12 hour non Class 1E uninterrupted power supply or during a station blackout event.

a. Please explain the required sequence of actions (time, location, signal, etc.) to open the closed de-energized valves, and how this additional operator action would affect the level 2 large release frequencies, especially during event sequences initiated by a station blackout. (For example evaluate the effect on FSAR Tier 2 Figure 19.1-7 for providing

recirculation cooling of the spreading room in the event of failure to open the valves.) Failure to open these valves could lead to containment failure after vessel breach (release categories 401 and 402), which were not identified as significant contributors to level 2 large release frequencies.

b. Please make the appropriate changes to the Level 2 PRA, including to the CETs, Figure 19.1-7, release categories, and fission product releases that reflect the effects of the design changes. Please report changes in the LRF and the CCFP.

c. In addition, explain how this operator action will be addressed in the operating strategy for severe accidents (OSSA), and emphasized in FSAR Tier 2, Section 19.2.5.

d. If there are significant changes, please resubmit a new complete response to the original response to RAI 19-103, which was provided in the response to RAI No.6.

e. Please document all changes resulting from the RAI response in the next version of the FSAR (both in Tier 1 and in Tier 2).

f. Are there any design basis accidents for which the SAHRS would be required? If so, what are these and how would the system be used?