ArevaEPRDCPEm Resource

From: Snyder, Amy
Sent: Friday, April 12, 2013 9:42 AM
To: usepr@areva.com
Cc: Mrowca, Lynn; Pohida, Marie; Ford, Tanya; Segala, John; RYAN Tom (AREVA)
Subject: U.S. EPR Design Certification Application Final RAI No. 579, FSAR Ch.19
Attachments: FINAL RAI_579_SPRA_7048.doc

Attached please find the subject request for additional information (RAI). A draft RAI was provided to you on March 19, 2013. On March 26, 2013, you informed us that the draft RAI does not contain proprietary information and that the draft RAI is clear and no further clarification is needed; However, you noted one editorial error. As result, the RAI was change to correct the editorial error.

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 or May 13, 2013**, 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.

Thank You,

Amy
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Request for Additional Information 579

Issue Date: 4/12/2013
Application Title: U. S. EPR Standard Design Certification - Docket Number 52-020
Operating Company: AREVA NP Inc.
Docket No. 52-020
Review Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section:

QUESTIONS

19-366

In FSAR Section 5.4.7.2.1, Design Features Addressing Shutdown and Mid-Loop Operation, the FSAR states, " Safety injection via MHSI with reduced discharge head during low loop level ensures availability of the LHSI pumps for RHR function."

On page Table 3.3.1-1 (page 12 of 14), DCS Sensors, Function Processors, Manual Actuation Switches, and Trip Actuation Devices, the FSAR states that, " SIS Actuation on Low Hot Leg Loop in Modes 5 and 6 with a setpoint of 18.9 inches in the hotleg" with note (o) "With P15 permissive validated" and note (u) "With Manual SIS - Loop Level Bypass inhibited."

The staff then reviewed insight 20 on Table 19.1-108 - US EPR PRA Based Insights. Insight 20 reads, "In shutdown operation, automatic MHSI actuation on a low RCS (hot leg) loop level....". The staff found no discussion in Chapter 19 in the FSAR on the use of the Loop Level Bypass switch that is shown on FSAR Figure 7.3-2 - SIS actuation. The staff also found no discussion in Section 5.4.7.2.1 on the use of the bypass switch. Based on discussions with AREVA at the US EPR audit in February of 2013, use of this bypass switch that would prevent automated safety injection was not modeled in the PRA. Based on conversations with AREVA at the US EPR audit, this bypass switch may be used to prevent automatic actuation of Safety Injection when personnel are performing hot leg and cold leg work (such as installing nozzle dams), the highest risk period during an outage. It was also unclear if this bypass switch would be used during reactor vessel head removal operations. Based on discussions with AREVA staff at the audit, it seems that no criteria was developed documenting when the loop level bypass would be used.

(1) The staff is requesting that FSAR Chapters 19.1.6 and Chapter 5.4.7.2.1 be revised to account for use of this RCS loop level bypass switch that would prevent automated safety injection during reduced inventory operation when used.

(2) The staff is requesting AREVA to re-quantify the EPR LPSD PRA, the sensitivity studies, the importance analysis, and dominant cutsets with the SIAS removed since there is no documented criterion as to when this bypass would be used for POSs CB and D.

(3) The staff is requesting AREVA to update the FSAR Section 5.4.7.2.1 and Chapter 19 to include information specifying the location of the upper and lower instrumentation taps for the hot leg level indication

(4) The EPR PRA did not specifically model nozzle dam installation since it was considered an infrequent evolution. The EPR PRA assumes that the core will offloaded every fuel cycle. The FSAR should either include the full core offload as a COL holder item or assess the risk from nozzle dam installation. If nozzle dams are used, to ensure that the risk of a sudden loss of RCS inventory during nozzle dam installation/removal and cold leg work does not invalidate the results of the EPR PRA, the staff is requesting EPR to update the US EPR risk insight 82 and Section 5.4.7 of the FSAR to state that the following recommendations will be implemented consistent with GL 88-17 and IN 88-36. These important operator actions needs to be documented as risk significant operator actions in Chapter 19 of the FSAR:

(a) A pressurizer manway (if analysis shows this to be a sufficient vent path) or otherwise create a

suitable opening to limit the pressurization which could follow an extended loss of DHR while the nozzle dams and the reactor vessel head are in place.

(b) A hotleg manway will be the first manway to be opened, and a hot leg nozzle dam will be the last dam to be installed.

(c) A hot leg manway and its associated hot leg pipe will be kept open to provide an adequate vent path whenever any cold leg openings are made.

(d) The expeditious actions in GL - 88-17 will be implemented.

(5) The EPR CDF from overdraining the RCS to reach midloop conditions (UCLD) is reported as approximately 8E-9 per calendar year. This reduction, which is orders of magnitude lower than current PWR operating data, is based on (1) failure of automatic isolation of CVS on low hot leg level and (2) failure of the operator to terminate the drain down if the automatic isolation fails. This operator failure was assumed to be an exceptionally small likelihood of 5E-5. In order for the staff to evaluate the risk of overdraining, AREVA is requested to document in Chapter 19 and Section 5.4.7.2.1 of the FSAR (a) the hotleg level at which SG nozzle dams are to be installed (b the hot leg level/set point at which this automatic isolation is supposed to occur, (c) the highest hot leg level at which vortexing is expected to initiate in the hotleg given a RHR flow rate of 2250 gpm required by TS surveillance testing, (d) the highest anticipated RCS drain rate during reduced inventory operations, and (e) a discussion of how the midloop tests referenced in FSAR Section 14.2.12.2.5 Mid-Loop Operations Verification (Test #017) will confirm item (d) above.

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As a result of the PRA Audit on February 4-7, 2013, the staff finds that several staff's findings from its U.S. EPR DC review have not been incorporated into the PRA Revision 1, i.e., asymmetric configuration modeling, the use of EPRI TR-102266 in estimating flooding frequency which may not include non-piping components, the use of superseded RES/OERAB/S02-01, "Fire Events – Update of U.S. Operating Experience 1986-1999," to estimate U.S. EPR fire ignition frequencies, etc. These findings are considered to be "key sources of uncertainty" that may have significant impact on the use of PRA for regulatory decision making.
The risk associated with these findings were assessed by performing sensitivity studies. However, to ensure that the uncertainties are addressed in future PRA applications, please perform a systematic search to identify all key sources of uncertainty from all PRA areas and list them in the U.S. EPR FSAR as a separate table as part of the risk insights.