ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Friday, November 05, 2010 8:33 AM
To: 'usepr@areva.com'
Cc: Morton, Wendell; Spaulding, Deirdre; Jackson, Terry; Canova, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 452(5161), FSAR Ch. 7
Attachments: RAI_452_ICE1_5161.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on October 20, 2010, and discussed with your staff on November 4, 2010. No change is made to the draft RAI 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,
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Hearing Identifier: AREVA_EPR_DC_RAIs
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11/05/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 07.03 - Engineered Safety Features Systems
Application Section: 7.3

QUESTIONS for Instrumentation, Controls and Electrical Engineering 1 (AP1000/EPR Projects) (ICE1)

07.03-35

Follow-up to RAI No. 60, Question 07.03-19

Provide additional information regarding how single failures identified in the Protection System (PS) system-level FMEA in Section 7.3 correlate to the pre-defined failure states of the PS. Also provide additional information on how the PS Inspection, Tests, Analysis, and Acceptance Criteria (ITAAC) address predefined failure states of the PS.

10 CFR 50.55a(h) incorporates by reference IEEE Std. 603-1991. Clause 5.5 of IEEE Std. 603-1991 requires, in part, that safety systems shall be designed to accomplish their safety functions under the full range of applicable conditions enumerated in the design basis. Initially, the staff requested in RAI No. 60, Question 07.03-19, that the applicant demonstrate how the U.S. EPR design addresses guidance from SRP Section 7.1-C (in particular, guidance for IEEE Std. 603-1991, Clause 5.5) which states, in part, that instruments should fail into a safe-state, a failure of hardware or software should not inhibit manual initiation of a protective function and upon system restoration from a loss of power condition, actuated components should not automatically transfer out of the predefined failure state.

The applicant responded to the staff's question by pointing out that IEEE Std. 603-1991, Clause 5.5, was addressed by U.S. EPR FSAR, Tier 1, Section 2.4.1, ITAAC Item 4.10. The staff found the applicant's response to RAI No. 60, Question 07.03-19, did not fully address the question. ITAAC Item 4.10 does not address the safe-states of the PS nor that operator intervention is required to move an actuated component out of a predefined failure state in the case of a loss of power, EMI/RFI, etc. Also, U.S. EPR FSAR, Tier 2, Section 7.3.2.2, does not address this issue. The staff is requesting the applicant to:

a. Provide information in Section 7.3.2.2 on the safe-states of the PS and how they correlate with the identified single failures in the system-level FMEA and how the above-referenced guidance is addressed.
b. Provide clarification on how ITAAC Item 4.10 in US EPR FSAR, Tier 1, Section 2.4 addresses the guidance referenced in SRP 7.1-C. Specifically, how does the ITAAC verify that PS components remain in a predefined failure state upon restoration of power, etc.?

07.03-36

Follow-up to RAI No. 60, Question 07.03-01

Provide an ITAAC to the U.S. EPR design that specifically tests the functionality of the self-test features.

10 CFR 50.55a(h) incorporates by reference IEEE Std. 603-1991. Clause 5.7 of IEEE Std. 603-1991 requires, in part, that capability for testing and calibration of safety system equipment shall be provided during power operation and shall duplicate, as closely as practicable, performance of the safety function. In RAI No. 60, Question 07.03-01, the staff requested the applicant explain how the design functionality of the self-testing features is verified in the U.S. EPR design. The applicant intends to take credit for the self-testing features to meet the requirements of IEEE Std. 603-1991, Clause 5.7. Per guidance from SRP Section 7.3, 10 CFR 52.47(b)(1) requires, in part, that ITAAC be performed to provided a reasonable assurance of design functionality.

The applicant responded to RAI No. 60, Question 07.03-01, by pointing to the response for RAI 78, Supplement 2, which revised U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 5.7. The response is insufficient as ITAAC Item 4.5 does not address the self-test features directly, nor does it provide an alternative method of design verification. The staff requests the applicant provide an ITAAC that directly tests all the design attributes of the self-test features so that the staff would have reasonable assurance that the self-test features can meet the requirements of IEEE Std. 603-1991, Clause 5.7.