

ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Thursday, March 15, 2012 3:55 PM
To: 'usepr@areva.com'
Cc: Morton, Wendell; Zhang, Deanna; Spaulding, Deirdre; Mott, Kenneth; Truong, Tung; Zhao, Jack; Mills, Daniel; Jackson, Terry; Canova, Michael; Segala, John; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 542 (6336), FSAR Ch. 7 - NEW PHASE 4 RAI
Attachments: RAI_542_ICE1_6336.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on March 2, 2012, and discussed with your staff on March 12, 2012. No change is made to the draft RAI as a result of this 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
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Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 3824

Mail Envelope Properties (0A64B42AAA8FD4418CE1EB5240A6FED16DCE947BF7)

Subject: U.S. EPR Design Certification Application RAI No. 542 (6336), FSAR Ch. 7 -
NEW PHASE 4 RAI
Sent Date: 3/15/2012 3:54:44 PM
Received Date: 3/15/2012 3:54:46 PM
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Post Office: HQCLSTR02.nrc.gov

Files	Size	Date & Time
MESSAGE RAI_542_ICE1_6336.doc	756 38394	3/15/2012 3:54:46 PM

Options

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

Request for Additional Information No. 542(6336), Revision 0

3/15/2012

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020

SRP Section: 07.01 - Instrumentation and Controls - Introduction
Application Section: 07.01

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

07.01-52

OPEN ITEM

New Phase 4 RAI

Provide a consolidated description and diagrams illustrating how the Teleperm XS (TXS) watchdog timer (WDT) would be able to execute the reactor trip function if the Actuation Logic Unit (ALU) processor locks-up. In addition, describe the dependency of the WDT on the ALU software and hardware to perform its functions.

10 CFR 50.55a(h) incorporates by reference IEEE Std. 603-1991. Clause 5.5 of IEEE Std. 603-1991 requires that the safety systems shall be designed to accomplish their safety functions under the full range of applicable conditions enumerated in the design basis. Technical Report ANP-10315P, Section 2.2.6.2, addresses the function and operation of the WDT. As currently written, Section 2.2.6.2 does not provide an adequate level of detail on the design function and operation of the WDT. The applicant is requested to provide a detailed description for how the WDT would initiate a reactor trip, in a timely manner, if an ALU function processor experiences a software or hardware-based failure that prevents the ALU function processor from performing its safety function. Specifically, the applicant is requested to provide answers to the following items.

- a. Provide a detailed description within the final safety analysis report or within Technical Report ANP-10315P that clearly explains how the WDT will initiate a reactor trip signal within the Protection System and to verify this action is performed in a timely manner. If the description is provided in Technical Report ANP-10315, provide a pointer in the final safety analysis report to the applicable sections in the report.
- b. Provide a diagram that clearly demonstrates how the WDT interfaces with other TXS function processor components and its reliance upon other components to perform its function.
- c. Provide a logic diagram that demonstrates how the WDT's design configuration facilitates a reactor trip on demand. Specifically, provide a more detailed description and a functional logic diagram that demonstrates how the WDT "hardwired signal" switch off the power supplies of a function processor's I/O modules and how does this lead to a reactor trip signal initiation.

- d. Is the “hardwired signal” used to switch off the affected function processor’s I/O power supply the same signal used to initiate the Exception-Handler and are those signals independent of each other?
- e. Describe the impact of an Run-Time Environment software failure on the WDT’s operations.
- f. Describe how the WDT’s operations are affected once the Exception-Handler is initiated. Specifically, when the applicant states that after a second “exceptional” situation occurs after a reset, which could take as long as five minutes or more, what functions or actions is the WDT performing during the this time frame or during multiple resets of a function processor?
- g. Describe in greater detail the interaction between the Run-Time Environment software with the various types of TXS system hardware components. In particular, describe in greater detail what hardware components the Run-Time Environment interfaces with (WDTs, LEDs, EEPROMs, Hardware Organizational Tool, etc.) and the method for how this interaction occurs, either directly or indirectly.