ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Thursday, February 17, 2011 8:40 AM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); RYAN Tom (AREVA); HUDSON Greg (AREVA); BUDZIK Dennis (AREVA); GARDNER Darrell (AREVA); WILLIFORD Dennis (AREVA)
Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 452, FSAR Ch. 7 - Question 7.3-35
Attachments: RAI 452 Response US EPR DC - DRAFT.pdf

Getachew,

To support the final response date of March 30, 2011, attached is a draft response for RAI 452 question 7.3-35. Please let me know if the staff has questions or if the response can be sent as a final response.

Thanks,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Monday, December 06, 2010 4:50 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); PANNELL George (CORP/QP)
Subject: Response to U.S. EPR Design Certification Application RAI No. 452, FSAR Ch. 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 452 Response US EPR DC," provides a schedule since a technically correct and complete response to the question is not provided.

The following table indicates the respective pages in the response document, "RAI 452 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 452 07.03-35	2	2
RAI 452 07.03-36	3	3

A complete answer is not provided for 2 of the 2 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 452 07.03-35	March 30, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, November 05, 2010 8:33 AM
To: ZZ-DL-A-USEPR-DL
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

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 2563

Mail Envelope Properties (199EBB4D1CD9644D9472AA84D5D8EFA71C9A05)

Subject: DRAFT Response to U.S. EPR Design Certification Application RAI No. 452, FSAR Ch. 7 - Question 7.3-35
Sent Date: 2/17/2011 8:40:18 AM
Received Date: 2/17/2011 8:40:24 AM
From: BRYAN Martin (EXTERNAL AREVA)

Created By: Martin.Bryan.ext@areva.com

Recipients:
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"HUDSON Greg (AREVA)" <Greg.Hudson@areva.com>
Tracking Status: None
"BUDZIK Dennis (AREVA)" <Dennis.Budzik@areva.com>
Tracking Status: None
"GARDNER Darrell (AREVA)" <Darrell.Gardner@areva.com>
Tracking Status: None
"WILLIFORD Dennis (AREVA)" <Dennis.Williford@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	2998	2/17/2011 8:40:24 AM
RAI 452 Response US EPR DC - DRAFT.pdf	423013	

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

Response to

Request for Additional Information No. 452(5161), Revision 0

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)

Question 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.?

Response to Question 07.03-35:

The PS divisions are supplied power by a safety-related, battery-backed, diesel-backed, uninterruptible electrical bus. In case of loss of offsite power (LOOP), each PS division is supplied by its own battery until the emergency diesel generators (EGDs) start and connect to the bus. A single failure of a divisional battery may result in loss of power to a PS division. In that case, the processors in the division shut down, no data communication is sent from the division, and the outputs go to a “zero” state. As a result, the division’s RT devices open (the tripped state), and no actuation of engineered safety feature actuation system (ESFAS) components are controlled by that division. The other three PS divisions remain capable of performing their protective functions. When power is restored to a PS division, the processors go through a reset and startup self-test mode, during which the outputs remain in a “zero” state. After the startup self-test is successfully completed, each processor enters its normal cyclic operation mode. The RT outputs will transition from the “zero” state (trip) to their normal “one” state (no trip). This action alone does not return the affected RT breaker to its normal state.

Manual action is required (re-rack the breaker) to return the breaker to its closed position. ESFAS outputs will remain in their normal “zero” state after the startup self-test is successfully completed and when each processor enters its normal cyclic operation mode. If a design basis event is in progress during a restoration of power, a change of state of the ESFAS outputs (to the actuate state) would occur. Technical Report ANP-10309P will be revised to include this information in support of the PS FMEA.

Both “spurious” and “blocking” failures of the PS outputs are analyzed in the PS FMEA and are acceptable. If a PS division did not function as designed during a restoration of power, the impact to the plant is bounded by the FMEA results. Because the existing FMEA bounds the PS outputs from one division acting in adversely during a restoration of power, and the results of this multiple failure scenario are acceptable to plant safety, no ITAAC is required to address the “restoration of power” scenario.

PS equipment is located in a mild environment. The mild environment is protected by safety-related building structures and safety-related heating, ventilation, and air conditioning (HVAC) systems. No single failure results in adverse environmental conditions for the PS equipment. Technical Report ANP-10309P will be revised to include this information in support of the PS FMEA.

U.S. EPR FSAR Tier 2, Section 7.2 and Section 7.3 will be revised to delete PS FMEA information. Instead, Technical Report ANP-10309P will be revised to add this information.

To support submittal of complete and consistent information, and considering multiple RAI responses and design changes communicated to the NRC staff, the U.S. EPR FSAR Tier 2, Section 7.2 and Technical Report ANP-10309P revisions described in this response will be submitted with the Response to RAI 442, Question 07.01-27.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.