

ArevaEPRDCPEm Resource

From: WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]
Sent: Friday, June 12, 2009 5:19 PM
To: Tesfaye, Getachew
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 60, FSAR Ch 7, Supplement 4
Attachments: RAI 60 Supplement 4 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 7 of the 20 questions of RAI No. 60 on November 26, 2008. AREVA NP submitted Supplement 1 to the response on January 14, 2009 to address 1 of the remaining 13 questions. AREVA NP submitted Supplement 2 response on March 3, 2009 to 1 of the remaining 12 questions. AREVA NP submitted Supplement 3 to the response on March 31, 2009 and provided a schedule for the remaining 11 questions. The attached file, "RAI 60 Supplement 4 Response US EPR DC" provides technically correct and complete responses to the remaining 11 questions, as committed.

The following table indicates the respective pages in the response document, "RAI 60 Supplement 4 Response US EPR DC," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 60 — 07.03-1	2	2
RAI 60 — 07.03-7	3	3
RAI 60 — 07.03-8	4	4
RAI 60 — 07.03-9	5	5
RAI 60 — 07.03-10	6	6
RAI 60 — 07.03-11	7	8
RAI 60 — 07.03-12	9	9
RAI 60 — 07.03-13	10	10
RAI 60 — 07.03-14	11	11
RAI 60 — 07.03-17	12	12
RAI 60 — 07.03-19	13	13

This concludes the formal AREVA NP response to RAI 60, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

New Plants Deployment

AREVA NP, Inc.

An AREVA and Siemens company

3315 Old Forest Road

Lynchburg, VA 24506-0935

Phone: 434-832-3694

Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)

Sent: Tuesday, March 31, 2009 1:42 PM

To: 'Getachew Tesfaye'

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); NOXON David B (AREVA NP INC); WELLS Russell D (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 60, Supplement 3

Getachew,

Based upon feedback from the NRC staff, AREVA NP is modifying the I&C architecture. Therefore, AREVA NP is unable to provide technically correct and complete responses to the questions that were scheduled to be completed by March 31, 2009.

The schedule for technically correct and complete responses to the remaining 11 questions has been changed as provided below:

Question #	Response Date
RAI 60 — 07.03-1	June 12, 2009
RAI 60 — 07.03-7	June 12, 2009
RAI 60 — 07.03-8	June 12, 2009
RAI 60 — 07.03-9	June 12, 2009
RAI 60 — 07.03-10	June 12, 2009
RAI 60 — 07.03-11	June 12, 2009
RAI 60 — 07.03-12	June 12, 2009
RAI 60 — 07.03-13	June 12, 2009
RAI 60 — 07.03-14	June 12, 2009
RAI 60 — 07.03-17	June 12, 2009
RAI 60 — 07.03-19	June 12, 2009

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

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From: Pederson Ronda M (AREVA NP INC)

Sent: Tuesday, March 03, 2009 3:48 PM

To: 'Getachew Tesfaye'

Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); PANNELL George L (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 60, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 7 of the 20 questions of RAI No. 60 on November 26, 2008. AREVA NP submitted Supplement 1 to the response on January 14, 2009 to address 1 of the remaining 13 questions. The attached file, "RAI 60 Supplement 2 Response US EPR DC" provides technically correct and complete responses to 1 of the remaining 12 questions, as committed.

The following table indicates the page in the response document, "RAI 60 Supplement 2 Response US EPR DC," that contains AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 60 — 07.03-2	2	2

The schedule for technically correct and complete responses to the remaining 11 questions is unchanged and provided below:

Question #	Response Date
RAI 60 — 07.03-1	March 31, 2009
RAI 60 — 07.03-7	March 31, 2009
RAI 60 — 07.03-8	March 31, 2009
RAI 60 — 07.03-9	March 31, 2009
RAI 60 — 07.03-10	March 31, 2009
RAI 60 — 07.03-11	March 31, 2009
RAI 60 — 07.03-12	March 31, 2009
RAI 60 — 07.03-13	March 31, 2009
RAI 60 — 07.03-14	March 31, 2009
RAI 60 — 07.03-17	March 31, 2009
RAI 60 — 07.03-19	March 31, 2009

Sincerely,

Ronda Pederson

ronda.pederson@areva.com

Licensing Manager, U.S. EPR Design Certification

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From: Pederson Ronda M (AREVA NP INC)

Sent: Wednesday, January 14, 2009 1:56 PM

To: 'Getachew Tesfaye'

Cc: PANNELL George L (AREVA NP INC); DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 60, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 7 of the 20 questions of RAI No. 60 on October 13, 2008. The attached file, "RAI 60 Supplement 1 Response US EPR DC.pdf," provides technically correct and complete responses to 1 of the remaining 13 questions, as committed.

The following table indicates the respective page in the response document, "RAI 60 Supplement 1 Response US EPR DC.pdf," that contains AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 60 — 07.03-15	2	2

The schedule for technically correct and complete responses to the remaining 12 questions is unchanged and provided below:

Question #	Response Date
RAI 60 — 07.03-1	March 31, 2009
RAI 60 — 07.03-2	March 3, 2009
RAI 60 — 07.03-7	March 31, 2009
RAI 60 — 07.03-8	March 31, 2009
RAI 60 — 07.03-9	March 31, 2009
RAI 60 — 07.03-10	March 31, 2009
RAI 60 — 07.03-11	March 31, 2009
RAI 60 — 07.03-12	March 31, 2009
RAI 60 — 07.03-13	March 31, 2009
RAI 60 — 07.03-14	March 31, 2009
RAI 60 — 07.03-17	March 31, 2009
RAI 60 — 07.03-19	March 31, 2009

Sincerely,

Ronda Pederson

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Phone: 434-832-3694

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From: Pederson Ronda M (AREVA NP INC)

Sent: Wednesday, November 26, 2008 3:49 PM

To: 'Getachew Tesfaye'

Cc: PANNELL George L (AREVA NP INC); DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 60, FSAR Ch 7, Revised Schedule

Getachew,

On October 13, 2008, AREVA NP provided technically correct and complete responses to 7 of the 20 questions and a schedule for responding to the remaining 13 questions of RAI No. 60. On October 22, 2008, a public meeting was held between AREVA NP Inc. and the NRC to discuss the U.S. EPR FSAR Chapter 7 and RAI No.'s 56 through 61.

A revised schedule for a technically correct and complete response to each of the remaining 13 questions of RAI No. 60 is provided below.

Question #	Response Date
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RAI 60 — 07.03-1	March 31, 2009
RAI 60 — 07.03-2	March 3, 2009
RAI 60 — 07.03-7	March 31, 2009
RAI 60 — 07.03-8	March 31, 2009
RAI 60 — 07.03-9	March 31, 2009
RAI 60 — 07.03-10	March 31, 2009
RAI 60 — 07.03-11	March 31, 2009
RAI 60 — 07.03-12	March 31, 2009
RAI 60 — 07.03-13	March 31, 2009
RAI 60 — 07.03-14	March 31, 2009
RAI 60 — 07.03-15	January 15, 2009
RAI 60 — 07.03-17	March 31, 2009
RAI 60 — 07.03-19	March 31, 2009

Sincerely,

Ronda Pederson

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From: WELLS Russell D (AREVA NP INC)

Sent: Monday, October 13, 2008 6:07 PM

To: 'Getachew Tesfaye'

Cc: 'John Rycyna'; Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)

Subject: Response to U.S. EPR Design Certification Application RAI No. 60, FSAR Ch 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 60 Response US EPR DC.pdf" provides technically correct and complete responses to 7 of the 20 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 60 Questions 07.03-3, and 07.03-5.

The following table indicates the respective pages in the response document, "RAI 60 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 60 — 07.03-1	2	2
RAI 60 — 07.03-2	3	3
RAI 60 — 07.03-3	4	4
RAI 60 — 07.03-4	5	5

RAI 60 — 07.03-5	6	6
RAI 60 — 07.03-6	7	8
RAI 60 — 07.03-7	9	9
RAI 60 — 07.03-8	10	10
RAI 60 — 07.03-9	11	11
RAI 60 — 07.03-10	12	12
RAI 60 — 07.03-11	13	13
RAI 60 — 07.03-12	14	14
RAI 60 — 07.03-13	15	15
RAI 60 — 07.03-14	16	16
RAI 60 — 07.03-15	17	17
RAI 60 — 07.03-16	18	19
RAI 60 — 07.03-17	20	20
RAI 60 — 07.03-18	21	21
RAI 60 — 07.03-19	22	22
RAI 60 — 07.03-20	23	23

A complete answer is not provided for 13 of the 20 questions. The schedule for a technically correct and complete response to this question is provided below.

Question #	Response Date
RAI 60 — 07.03-1	December 4, 2008
RAI 60 — 07.03-2	December 4, 2008
RAI 60 — 07.03-7	December 4, 2008
RAI 60 — 07.03-8	December 4, 2008
RAI 60 — 07.03-9	December 4, 2008
RAI 60 — 07.03-10	December 4, 2008
RAI 60 — 07.03-11	December 4, 2008
RAI 60 — 07.03-12	December 4, 2008
RAI 60 — 07.03-13	December 4, 2008
RAI 60 — 07.03-14	December 4, 2008
RAI 60 — 07.03-15	December 4, 2008
RAI 60 — 07.03-17	December 4, 2008
RAI 60 — 07.03-19	December 4, 2008

Sincerely,

(Russ Wells on behalf of)

Ronda Pederson

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New Plants Deployment

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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]

Sent: Friday, September 12, 2008 6:02 PM

To: ZZ-DL-A-USEPR-DL

Cc: Wendell Morton; Terry Jackson; Michael Canova; Joseph Colaccino; John Rycyna

Subject: U.S. EPR Design Certification Application RAI No. 60 (957), FSAR Ch7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 26, 2008, and on September 5, 2008, 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,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 572

Mail Envelope Properties (1F1CC1BBDC66B842A46CAC03D6B1CD4101953068)

Subject: Response to U.S. EPR Design Certification Application RAI No. 60, FSAR Ch 7,
Supplement 4
Sent Date: 6/12/2009 5:19:22 PM
Received Date: 6/12/2009 5:19:25 PM
From: WELLS Russell D (AREVA NP INC)

Created By: Russell.Wells@areva.com

Recipients:

"Pederson Ronda M (AREVA NP INC)" <Ronda.Pederson@areva.com>

Tracking Status: None

"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>

Tracking Status: None

"DELANO Karen V (AREVA NP INC)" <Karen.Delano@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	12447	6/12/2009 5:19:25 PM
RAI 60 Supplement 4 Response US EPR DC.pdf		106117

Options

Priority: Standard

Return Notification: No

Reply Requested: No

Sensitivity: Normal

Expiration Date:

Recipients Received:

Response to

Request for Additional Information No. 60, Supplement 4

9/12/2008

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

ICE1 Branch

Question 07.03-1:

Describe how the inspections, tests, analyses, and acceptance criteria (ITAAC) for the U.S. EPR Protection System will adequately verify the functionality and capabilities of the TELEPERM XS self-testing features to meet IEEE Std. 603-1991, Clauses 5.7 and 6.5.

10 CFR 52.47(b)(1) requires, in part, that ITAAC that are necessary and sufficient to provide reasonable assurance that, if the ITAAC are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity to the design certification, the provisions of the Act, and the Commission's rules and regulations. The ITAAC provided in DC FSAR, Tier 1, Section 2.4, does not appear to incorporate adequate ITAAC to verify the functionality of the self-testing features and its capability to meet the requirements in Clause 5.7 and 6.5 of IEEE 603-1991.

Response to Question 07.03-1:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 added U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.22 to address Clause 6.5 of IEEE 603-1991, and ITAAC item 4.5 was revised to address Clause 5.7 of IEEE 603-1991. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.03-7:

Describe how the inspections, tests, analyses, and acceptance criteria (ITAAC) for the U.S. EPR Protection System will adequately verify the functionality and capabilities of ESFAS to initiate an automatic protective function with the failure of a single instrument channel, or loss of division of logic to meet IEEE Std. 603-1991, Clauses 5.1.

IEEE Std. 603-1991, Clauses 5.1 requires, in part, the the safety systems shall perform all safety functions required for a design basis event in the presence of a single credible failure.

Response to Question 07.03-7:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 added U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.18 to address Clause 5.1 of IEEE 603-1991. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.03-8:

Describe how the inspections, tests, analyses, and acceptance criteria (ITAAC) for the U.S. EPR Protection System will adequately verify the functionality and capabilities of ESFAS to initiate an automatic protective function while in maintenance bypass or under testing to meet IEEE Std. 603-1991, Clauses 5.7, 6.7 and 8.3.

IEEE Std. 603-1991, Clauses 5.7, 6.7, and 8.3 requires the safety systems shall be able to initiate an automatic protective function while under testing or under a maintenance bypass. The ITAAC which is provided in DC FSAR, Tier 1, Section 2.4 and as such, does not appear to provide adequate testing to ensure that these requirements are met.

Response to Question 07.03-8:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 revised U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.5 to address Clause 5.7 and 6.7 of IEEE 603-1991. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

The U.S. EPR has sufficient redundancy that a power system redundancy configuration of zero is unlikely; therefore, bypassed and inoperable status indication for power systems supporting digital I&C, as described in clause 8.3 of IEEE 603-1991, is unnecessary.

FSAR Impact:

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

Question 07.03-9:

Describe how the inspections, tests, analyses, and acceptance criteria (ITAAC) for the U.S. EPR Protection System will adequately verify the functionality and capabilities of the Protection System to sense a completion of a protective action, and requirement of operator intervention to reset the system in order to meet IEEE Std. 603-1991, Clauses 5.2 and 7.3.

Clauses 5.2 and 7.3 require that when the sense and command features reset, the execute features shall not automatically return to normal; they require separate, deliberate operator action to be returned to normal. The ITAAC provided in DC FSAR, Tier 1, Section 2.4, does not specify a test and/or inspection that verifies completion of a specific protective action and subsequent operator reset such that the Protection System meets the requirements in IEEE 603-1991 Clauses 5.2 and 7.3.

Response to Question 07.03-9:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides an explanation of the ITAAC that address Clause 5.2 and Clause 7.3 of IEEE 603-1991. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.03-10:

Describe how the inspections, tests, analyses, and acceptance criteria (ITAAC) for the U.S. EPR Protection System will adequately verify the functionality and capabilities of Protection System to initiate the appropriate safety function while blocking an impending operating bypass to meet IEEE Std. 603-1991, Clauses 6.6 and 7.4.

IEEE Std. 603-1991, Clauses 6.6 and 7.4 requires that whenever the applicable permissive conditions are not met, a safety system shall automatically prevent the activation of an operating bypass or initiate the the appropriate safety functions. The ITAAC which is provided in DC FSAR, Tier 1, Section 2.4 does not appear to provide adequate testing to ensure that these requirements are met in order to satisfy clauses 6.6 and 7.4 of IEEE 603-1991.

Response to Question 07.03-10:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 revised U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.3 to address Clause 6.6 of IEEE 603-1991. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

Since the operating bypass capability is contained within the protection system, the ITAAC cited above will also address Clause 7.4 of IEEE 603-1991 on operating bypasses.

FSAR Impact:

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

Question 07.03-11:

Please describe in detail the systems accuracies and response time of the Protection System in the U.S. EPR DC FSAR, and how they adequately address functionality requirements as per IEEE Std. 603-1991, Clause 4.4.

Per guidance from Standard Review Plan, Section 7.1-C-4, IEEE Std. 603-1991 Clause 4.4 requires the identification of system response times and accuracies. This information does not appear to be available in DC-FSAR, Section 7.3, nor is it tested and/or inspected in the Protection System ITAAC, documented in DC FSAR, Tier 1, Section 2.4.

Response to Question 07.03-11:

The U.S. EPR is designed in accordance with IEEE STD 603-1998, which meets or exceeds the requirements established in IEEE STD 603-1991. Clause 4.4 identifies analytical limits associated with each variable which includes ranges and rates of change. In order to confirm protection system performance relative to analytical limits, time response testing is performed as an integral part of the commissioning of a nuclear power plant facility. Additional related information in the U.S. EPR FSAR is described below.

The Protection System reactor trip response times and system accuracies are addressed in U.S. EPR FSAR Tier 2, Section 7.2 *Reactor Trip System*. U.S. EPR FSAR Tier 2, Section 7.2.2.1.3 *Design Basis: Reactor Trip Input Variables (Clause 4.d of IEEE 603.1998)* addresses compliance to Clause 4.d:

“Each RT function is listed in Table 15.0-7 with the relevant normal trip setpoint, normal and degraded uncertainties, and time delays for the function. For each of these functions, Table 7.2.1 lists the input variables that are used either directly or as inputs to a calculation to initiate an RT. The range to be monitored for each of these variables is also listed in Table 7.2.1.”

U.S. EPR FSAR Tier 2, Table 15.0-7—Reactor Trip Setpoints and Delays Used in the Accident Analysis, lists the system accuracies and the system response time. The system response times are listed in Table 15.0-7 as “Time Delay”. For the reactor trip functions the time delay is from the time the value is sensed at the sensor until the stationary gripper releases. It includes sensor delay, I&C delay, and the delay for the trip breakers to open and the stationary gripper to release. The system accuracies are listed in Table 15.0-7 as “Uncertainty”. Both normal and degraded condition accuracies are provided in Table 15.0-7 for these trip functions.

The Protection System automatic actuation of engineered safety features (ESF) response times and system accuracies are addressed in the U.S. EPR FSAR Tier 2, Section 7.3 *Engineered Safety Features System*. U.S. EPR FSAR Tier 2, Section 7.3.2.1.3 *Design Basis: ESF Actuation Input Variables (Clause 4.d of IEEE 603.1998)* addresses compliance to Clause 4.d:

“Each ESF function is listed in Table 15.0-8 with the relevant normal trip setpoint, normal and degraded uncertainties, and time delays for the function. For each of these functions, Table 7.3.1 lists the input variables that are used either directly or as inputs to a calculation to actuate an ESF system. The range to be monitored for each of these variables is also listed in Table 7.3.1.”

U.S. EPR FSAR Tier 2, Table 15.0-8—Engineered Safety Features Functions Used in the Accident Analysis, lists the system accuracies and the system response time. The system response times are listed in Table 15.0-8 as “Time Delay (s)”. For the EFS functions the time delay represents the total time for completion of a function. The delay time includes sensor delay, I&C delay, and other delays as noted in Table 15.0-8 until the ESF function is completed. The system accuracies are listed in Table 15.0-8 as “Uncertainty”. Both normal and degraded condition accuracies are provided in Table 15.0-7 for these ESF functions.

The Protection System response times will be tested and verified as outlined in U.S. EPR FSAR Tier 2, Section 14.2.12.12.10 *Protection (Test #146)*.

FSAR Impact:

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

Question 07.03-12:

Please describe in detail how the Protection system (ESFAS) in the U.S. EPR DC FSAR adequately addresses functionality requirements as per IEEE Std. 603-1991, Clauses 4.5.

IEEE Std. 603-1991, Clause 4.5, has four sub-clauses as follows:

4.5.1 The points in time and the plant conditions during which manual control is allowed.

4.5.2 The justification for permitting initiation or control subsequent to initiation solely by manual means.

4.5.3 The range of environmental conditions imposed upon the operator during normal, abnormal, and accident circumstances throughout which manual operations shall be performed.

4.5.4 The variables in 4.4 that shall be displayed for the operator to use in taking manual action.

DC-FSAR Section 7.3.2.1.4 does not explicitly describe when manual control is available nor the variables that will be displayed for the operator to use in taking manual action which are subclauses 4.5.1 and 4.5.4. The ITAAC also do not explicitly mention and/or tests for these clauses as well.

Response to Question 07.03-12:

The documentation regarding when manual control is allowed and what variables are displayed for operator use in taking manual control is produced as part of the U.S. EPR human factors program. This evaluation is described in the "Function Analysis and Allocation Implementation Plan," 118-9018214-002, which has been submitted for NRC review.

The response to RAI 78 Question 14.03.05-4 provides a mapping of IEEE 603 Clause 4.5 documentation requirements to the appropriate ITAAC that verify compliance.

FSAR Impact:

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

Question 07.03-13:

Describe how the Protection System (ESFAS) for the U.S. EPR, as described in the DC FSAR, will adequately satisfy the functionality and capabilities IEEE Std. 603-1991, Clauses 4.10.2 and 4.10.4.

IEEE Std. 603-1991, Sub-clauses 4.10.2 and 4.10.4, require documentation of the point in time or plant conditions that define the proper completion of the safety function, the points in time or the plant conditions that require automatic control of protective actions and the point in time or the plant conditions that allow returning a safety system to normal. DC-FSAR Section 7.3.2.1.6 does not adequately address these clauses.

Response to Question 07.03-13:

As stated in U.S. EPR FSAR Tier 2, Section 7.3.2.1.6, the plant conditions that define proper completion of the safety function is documented in the U.S. EPR FSAR Tier 2, Chapter 15 analyses, and plant specific operating procedures document the plant conditions that allow returning the safety system to normal. Clauses 4.10.2 and 4.10.4 are addressed by U.S. EPR FSAR Tier 2, Section 7.3.2.1.6.

U.S EPR FSAR Tier 2, Section 15.0.4.1 states:

“The analysis of Chapter 15 events are generally terminated when the plant achieves a stable, controlled condition (i.e., the reactor is subcritical and remains subcritical, the core is covered, decay heat is being removed from the RCS, and secondary inventory levels are sufficient to maintain RCS temperatures). Subsequent actions, including cooldown, will be addressed in plant specific Emergency Operating Procedures (EOPs).”

The safety functions are considered complete when the plant achieves a stable, controlled condition. In the Results section of each U.S. EPR FSAR Tier 2, Chapter 15 analyzed event, a description is provided of how the plant reaches a stable, controlled state following the event.

U.S. EPR FSAR Tier 2, Table 1.8-2 contains the COL action item(s) related to documentation of plant-specific emergency operating procedures (EOP).

FSAR Impact:

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

Question 07.03-14:

Describe how the Protection System (ESFAS) for the U.S. EPR, as described in the DC FSAR, will adequately satisfy the functionality and capabilities IEEE Std. 603-1991, Clause 4.11.

IEEE Std. 603-1991, Clause 4.11 requires documentation of equipment protective provisions that prevent a safety systems from accomplishing its design function. This clause is not addressed in DC-FSAR Section 7.3 and there is insufficient detail in DC-FSAR Section 7.1.2.6.10 to make any evaluation concerning Clause 4.11.

Response to Question 07.03-14:

The functional requirements for the protection system described in U.S. EPR FSAR Tier 2, Sections 7.2 and 7.3, do not include any provisions for equipment protection that could prevent performance of safety functions.

If later in the design process a requirement is generated for the protection system to perform such functionality, the requirement will be documented consistent with Clause 4.11 of IEEE 603-1991. Implementation of such a requirement in the protection system design would be verified through closure of U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Commitment 4.14.

FSAR Impact:

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

Question 07.03-17:

Describe how Class 1E equipment identification considerations have been in the ITAAC.

Per review guidance from Standard Review Plan Section 7.1-C-11, Class 1E equipment identification should be made to conform to IEEE Std. 384-1992, which is endorsed by Regulatory Guide 1.75. The staff was not able to identify ITAAC that verifies the identification of Class 1E equipment.

Response to Question 07.03-17:

Clause 5.11 of IEEE 603-1991 provides the Class 1E equipment identification requirement, which is in accordance with IEEE 384. The Response to RAI 78, Supplement 2, Question 14.03.05-4 added U.S. EPR FSAR Tier 1, Section 2.4.1, ITAAC Item 4.19 to address Clause 5.11 of IEEE 603-1991. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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

Question 07.03-19:

Please provide more details on how the Protection System Design ITAAC for the U.S. EPR, as described in the DC FSAR, addresses the requirements of IEEE Std. 603-1991, Clause 5.5.

As per guidance from Standard Review Plan Section 7.1-C-9, for computer-based systems, 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 ITAAC in DC FSAR, Tier 1, Section 2.4, does not appear to test for these topics.

Response to Question 07.03-19:

The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides an explanation of the ITAAC that address Clause 5.5 of IEEE 603-1991. The Response to RAI 78, Supplement 2, Question 14.03.05-4 provides Table 14.03.05-1—ITAAC Mapping of I&C System Requirements, which points to ITAAC that address the IEEE 603 requirements in accordance with Standard Review Plan (SRP) 14.3.

FSAR Impact:

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