ArevaEPRDCPEm Resource

From: DUNCAN Leslie E (AREVA NP INC) [Leslie.Duncan@areva.com]
Sent: Friday, February 19, 2010 5:16 PM
To: Tesfaye, Getachew
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); PANNELL George L (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 3
Attachments: RAI 286 Supplement 3 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 8 of the 18 questions of RAI No. 286 on November 13, 2009. AREVA NP submitted Supplement 1 to the response on December 18, 2009 to address 4 of the remaining 10 questions. AREVA NP submitted Supplement 2 to the response on January 22, 2010 to provide a revised schedule for the remaining questions. The attached file, "RAI 286 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the remaining 6 questions. The schedule for a technically correct and complete response to question 07.09-47 remains unchanged, and the schedule for technically correct and complete responses to questions 07.08-9, 07.09-46, and March 5, 2010 has been changed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 286 Question 07.08-7.

The following table indicates the respective pages in the response document, "RAI 286 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.08-7	2	2
RAI 286 — 07.09-52	3	4

The schedule for a technically correct and complete response to question 07.09-47 remains unchanged and is provided below. The schedule for technically correct and complete responses to questions 07.08-9, 07.09-46, and March 5, 2010 has been changed and is provided below.

Question #	Response Date
RAI 286 — 07.08-9	April 16, 2010
RAI 286 — 07.09-46	March 5, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	March 5, 2010

Sincerely,

Les Duncan
Licensing Engineer
AREVA NP Inc.
An AREVA and Siemens Company
Tel: (434) 832-2849
Leslie.Duncan@areva.com

From: DUNCAN Leslie E (AREVA NP INC)
Sent: Friday, January 22, 2010 6:39 PM
To: 'Tesfaye, Getachew'
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. 286, FSAR Ch. 7, Supplement 2

Getachew,

AREVA NP Inc. provided responses to 8 of the 18 questions of RAI No. 286 on November 13, 2009. AREVA NP submitted Supplement 1 to the response on December 18, 2009 to address 4 of the remaining 10 questions.

AREVA NP is unable to provide a response to the 5 RAI No. 286 questions with a commitment date of January 22, 2010. The commitment date for these 5 questions has been changed to February 19, 2010 to allow time to incorporate comments and feedback from the upcoming 1/25/10-1/26/10 meeting with the NRC related to U.S. EPR FSAR Chapter 7.

The schedule for a technically correct and complete response to RAI 286 Question 07.09-47 is unchanged and provided below. The schedule for technically correct and complete responses to the other 5 RAI questions has been changed and is provided below:

Question #	Response Date
RAI 286 — 07.08-7	February 19, 2010
RAI 286 — 07.08-9	February 19, 2010
RAI 286 — 07.09-46	February 19, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	February 19, 2010
RAI 286 — 07.09-52	February 19, 2010

Sincerely,

Les Duncan
Licensing Engineer
AREVA NP Inc.
An AREVA and Siemens Company
Tel: (434) 832-2849
Leslie.Duncan@areva.com

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, December 18, 2009 12:04 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); KOWALSKI David J (AREVA NP INC); PANNELL George L (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 1

Getachew,

AREVA NP Inc. provided responses to 8 of the 18 questions of RAI No. 286 on November 13, 2009. The attached file, "RAI 286 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 4 of the remaining 10 questions, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 286 Questions 07.06-3 and 07.07-19.

The following table indicates the respective pages in the response document, "RAI 286 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.06-3	2	2
RAI 286 — 07.07-19	3	3
RAI 286 — 07.09-53	4	6
RAI 286 — 07.09-57	7	7

The schedule for a technically correct and complete response to the remaining questions is unchanged and provided below.

Question #	Response Date
RAI 286 — 07.08-7	January 22, 2010
RAI 286 — 07.08-9	January 22, 2010
RAI 286 — 07.09-46	January 22, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	January 22, 2010
RAI 286 — 07.09-52	January 22, 2010

Sincerely,

Ronda Pederson
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Licensing Manager, U.S. EPR Design Certification
AREVA NP Inc.
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From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, November 13, 2009 3:34 PM
To: 'Tesfaye, Getachew'
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. 286, FSAR Ch. 7

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information RAI 286. The attached file, "RAI 286 Response US EPR DC" provides technically correct and complete responses to 8 of the 18 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 286 Questions 07.08-8, 07.09-50, 07.09-55 and 07.09-58.

The following table indicates the respective page(s) in the response document, "RAI 286 Response US EPR DC," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.06-3	2	2
RAI 286 — 07.07-18	3	4
RAI 286 — 07.07-19	5	5
RAI 286 — 07.08-7	6	6
RAI 286 — 07.08-8	7	7
RAI 286 — 07.08-9	8	8
RAI 286 — 07.09-46	9	9
RAI 286 — 07.09-47	10	10
RAI 286 — 07.09-49	11	11
RAI 286 — 07.09-50	12	12
RAI 286 — 07.09-51	13	13
RAI 286 — 07.09-52	14	14
RAI 286 — 07.09-53	15	15
RAI 286 — 07.09-54	16	17
RAI 286 — 07.09-55	18	18
RAI 286 — 07.09-56	19	20
RAI 286 — 07.09-57	21	21
RAI 286 — 07.09-58	22	22

A complete answer is not provided for 10 of the 18 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 286 — 07.06-3	December 18, 2009
RAI 286 — 07.07-19	December 18, 2009
RAI 286 — 07.08-7	January 22, 2010
RAI 286 — 07.08-9	January 22, 2010
RAI 286 — 07.09-46	January 22, 2010
RAI 286 — 07.09-47	February 26, 2010
RAI 286 — 07.09-49	January 22, 2010
RAI 286 — 07.09-52	January 22, 2010
RAI 286 — 07.09-53	December 18, 2009
RAI 286 — 07.09-57	December 18, 2009

Sincerely,

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From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Wednesday, October 14, 2009 8:06 PM

To: ZZ-DL-A-USEPR-DL
Cc: Cheung, Calvin; Mott, Kenneth; Zhang, Deanna; Spaulding, Deirdre; Jackson, Terry; Canova, Michael; Guardiola, Maria; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 286(3567,3561,3562,3563), FSAR Ch. 7

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 27, 2009, and discussed with your staff on September 3, 2009. Drat RAI Question 07.09-48 was deleted and Draft RAI Questions 07.09-47, 07.09-51, and 07-09-52 were modified 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: 1159

Mail Envelope Properties (F322AA625A7A7443A9C390B0567503A10199C725)

Subject: Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 3
Sent Date: 2/19/2010 5:15:44 PM
Received Date: 2/19/2010 5:15:47 PM
From: DUNCAN Leslie E (AREVA NP INC)

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RAI 286 Supplement 3 Response US EPR DC.pdf	116694	

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

Response to

Request for Additional Information No. 286, Supplement 3
10/14/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 07.06 - Interlock Systems Important to Safety
SRP Section: 07.07 - Control Systems
SRP Section: 07.08 - Diverse Instrumentation and Control Systems
SRP Section: 07.09 - Data Communication Systems

Application Section: FSAR Ch. 7

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

Question 07.08-7:

Follow-up to RAI Question No. 07.08-2

Describe the Diverse Actuation System (DAS) on-line self-test features that address the testing and surveillance criteria of Generic Letter 85-06, "Quality Assurance Guidance for ATWS Equipment that is Not Safety-Related." Specifically, identify the self-test features and their coverage of possible failures that might occur with the DAS. Also, identify any other testing that may be applied to the DAS for system testing and surveillance.

10 CFR 50.62 requires, in part, that equipment used to mitigate an Anticipated Transient Without Scram should perform it in a reliable manner. Generic Letter 85-06 and its enclosure titled "QA Guidance for Non-Safety-Related ATWS Equipment", provide guidance on quality and reliability criteria for such systems. The staff acknowledges that DAS self-tests will be used, at least in part, to address the testing criteria for the DAS. However, the staff requests the following information regarding the self tests:

a) Identify the types of self tests and their coverage for potential failures in the DAS.

b) How the DAS online self-test will indicate DAS operational status (i.e., proper and correct operation, failure of DAS functionality).

c) Identification of any other testing outside of the self tests for the DAS.

The staff also request that information used to address this RAI request be inserted within the applicable Chapter 7 FSAR sections.

Response to Question 07.08-7:

Specific self-testing features and coverage depend upon the specific technology selected to implement the DAS, and are thus not specified in the U.S. EPR FSAR. To address parts a and c of this question, additional inspections, tests, analyses, and acceptance criteria will be added to U.S. EPR FSAR Tier 1, Section 2.4.24.

Part b. of this question is addressed in the following paragraph in U.S. EPR FSAR Tier 2, Section 7.8.1.1.3:

> "Alarms and indications are processed by the DAS and are sent to the PICS for display. The DAS provides accurate status information to the operator in the main control room. This includes system operation status (i.e., bypass, initiate, standby, normal), power availability, and any system faults or messages pertinent to plant operation. Confirmation of actuation of components by DAS is obtained through check back signals from the PACS to verify the status of the actuator."

FSAR Impact:

U.S. EPR FSAR, Tier 1, Section 2.4.24 will be revised as described in the response and indicated on the enclosed markup.

Question 07.09-52:

Follow-up to RAI Question Nos. 07.09-29 and 07.09-30

Demonstrate that plant data network is of sufficient quality and capacity to support PICS functions to meet the control room capabilities required by 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 19, and the D3 requirements to meet Staff Requirements Memorandum (SRM) for SECY-93-87.

GDC 19, "Control Room," requires a control room be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including loss-of-coolant accidents. Additionally, the SRM for SECY-093-87 provides the four point position on Diversity and Defense in Depth (D3) for ALWRs. Point 4 requires a set of displays and controls located in the main control room to be provided for manual system-level actuation of critical safety functions and for monitoring of parameters that support safety functions. The displays and controls should be independent and diverse from the computer-based safety systems.

U.S. EPR DC-FSAR, Section 7.1.1.3.2, describes the capabilities of the Process Information and Control System (PICS) with regards to the capability for safe operation of the plant from the main control room during normal and accident conditions. In addition, the PICS is credited to meet Point 4 of the D3 requirements specified in the SRM for SECY-093-87. The capabilities of the PICS to achieve both hot and cold shut down conditions from the remote shutdown system are described in Section 7.1.1.3.2. Equipment such as network switches and electrical and fiber optic cables are provided (as part of the plant data network) to support the required data communications between the PICS and other instrumentation and control systems. Provide an ITAAC that verifies the plant data network is of sufficient quality and capacity to support PICS functions.

Response to Question 07.09-52:

Plant safety protection is provided by automatic operation of either the protection system (PS), assuming no software common-cause failure (CCF), or automatic operation of the diverse actuation system (DAS) in case the PS experiences a software CCF. Once the automatic systems have mitigated the postulated events, the response time requirements for interaction with fluid systems is not as critical, whether it involves process monitoring or sending control commands to breakers, pumps or valves. The normal control systems that will be utilized in the U.S. EPR must have adequate bandwidth to reliably operate and maneuver all the other systems in the reactor plant needed for plant operation and also to keep the plant reliably on-line. These I&C systems will be specified and procured consistent with the application of digital control technology currently in use in other power generation facilities. The verification of design features of the PICS and the non-safety-related plant data network through inspections, tests, analyses and acceptance criteria (ITAAC) is not appropriate for the same reasons as those presented in the response to RAI 7.9-53. Those reasons are:

- GDC 19 is cited as a regulatory basis for requesting ITAAC related to demonstration of sufficient quality and capacity of the non safety plant data network to support PICS. ITAAC related to the quality and capacity of plant data networks would not address the GDC 19 considerations identified in Standard Review Plan, Section 14.3, Appendix C. This is further explained in RAI response 7.9-53.

- Point 4 of SECY-093-87 is cited as a regulatory basis for requesting the subject ITAAC; but it is not listed as a requirement to be addressed through ITAAC in Standard Review Plan, Section 14.3, Appendix C for the Instrumentation and Control Systems Review Checklist.
- The non-safety-related plant data network design did not satisfy selection criteria for U.S. EPR design features that should be addressed in Tier 1 and ITAAC and therefore, ITAAC was not created for this design feature. U.S EPR FSAR Tier 2, Section 14.3.2 describes the selection process.

The ability of the plant data network to support PICS functions is verified during start-up testing. U.S. EPR FSAR Tier 2, Section 14.2.12.11.6 (test #129) describes PICS start-up testing.

FSAR Impact:

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

U.S. EPR Final Safety Analysis Report Markups

2.4.24 Diverse Actuation System

1.0 Description

The diverse actuation system (DAS) is a non-safety related digital I&C system.

The DAS provides the following non-safety related functions:

- Automatic anticipated transient without scram (ATWS) mitigation functions.
- Automatic PS software common cause failure mitigation functions.
- Automatic station blackout (SBO) mitigation functions.

2.0 Arrangement

2.1 The DAS equipment is located as listed in Table 2.4.24-1—Diverse Actuation System Equipment.

2.2 Physical separation exists between the four divisions of the DAS.

3.0 I&C Design Features, Displays and Controls

3.1 The DAS hardware and software are developed using a design process composed of five life cycle phases with each phase having design outputs which must conform to the requirements of that phase. The five life cycle phases are the following:

1. Basic design phase.
2. Detailed design phase.
3. Manufacturing phase.
4. Testing phase.
5. Installation and commissioning phase.

3.2 The system hardware and system software in the DAS are diverse from the system hardware and system software in the protection system (PS).

3.3 The DAS generates signals for automatic actuation of the functions identified in Table 2.4.24-2—Functions Automatically Actuated by the DAS.

07-08-07

3.4 The DAS allows manual, system-level actuation of the functions listed in Table 2.4.24-3.

3.5 Functions of the DAS that are not tested by the self-test features are identified and included in the periodic testing procedures.

4.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.24-4 lists the DAS ITAAC.

Table 2.4.24-4—Diverse Actuation System ITAAC (2 Sheets)

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
3.3	The DAS generates signals for automatic actuation of the functions identified in Table 2.4.24-2.	Tests will be performed on the as-built DAS using test signals.	The DAS generates signals for automatic actuation of the functions identified in Table 2.4.24-2.
3.4	The DAS allows manual, system-level actuation of the functions listed in Table 2.4.24-3.	Tests will be performed on the as-built DAS using test signals.	The DAS generates signals allowing manual actuation of the functions identified in Table 2.4.24-3.
3.5	Functions of the DAS that are not tested by the self-test features are identified and included in the periodic testing procedures. 07-08-07	a. An analysis is performed to identify functions of the DAS that are not tested by self-test features. b. An inspection is performed to verify that functions of the DAS that are not tested by self-test features are included in periodic testing procedures.	a. A report exists which identifies any functions of the DAS that are not tested by self-test features. b. Functions of the DAS that are not tested by self-test features are included in periodic testing procedures.

Next File