ArevaEPRDCPEm Resource

From: BRYAN Martin (EXTERNAL AREVA) [Martin.Bryan.ext@areva.com]
Sent: Tuesday, February 08, 2011 2:11 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (AREVA); ROMINE Judy (AREVA); BENNETT Kathy (AREVA); RYAN Tom (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 12
Attachments: RAI 286 Supplement 12 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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The RAI 286 Supplement 4 response on February 26, 2010 provided technically correct and complete responses to 1 of the remaining 4 questions. That submittal completed responses to 15 of the 18 questions. The RAI 286 Supplement 5 response on March 5, 2010 provided responses to 2 of the remaining 3 questions. The RAI 286 Supplement 6 response on April 16, 2010, Supplement 7 on May 28, 2010, Supplement 8 on June 30, 2010, and Supplement 9 on September 28, 2010, Supplement 10 on November 30, 2010, and Supplement 11 on January 13, 2011, provided a revised response date for question 07.08-9. Based on discussions with NRC, the attached file, "RAI 286 Supplement 12 Response US EPR DC.pdf" provides a technically correct and complete response to the remaining question, as committed.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report which support the response to these two questions.

The following table indicates the respective pages in the response document, "RAI 286 Supplement 12 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 286 07.08-9	2	3

This concludes the formal AREVA NP response to RAI 286, and there are no questions from this RAI for which AREVA NP has not provided responses.

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: BRYAN Martin (External RS/NB)
Sent: Thursday, January 13, 2011 4:43 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. 286, FSAR Ch. 7, Supplement 11

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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The RAI 286 Supplement 4 response on February 26, 2010 provided technically correct and complete responses to 1 of the remaining 4 questions. That submittal completed responses to 15 of the 18 questions. The RAI 286 Supplement 5 response on March 5, 2010 provided responses to 2 of the remaining 3 questions. The RAI 286 Supplement 6 response on April 16, 2010, Supplement 7 on May 28, 2010, Supplement 8 on June 30, 2010, and Supplement 9 on September 28, 2010, and Supplement 10 on November 30, 2010, provided a revised response date for question 07.08-9.

To allow time to interact with the staff on this remaining question the response date is being revised. The schedule for technically correct and complete response to question 07.08-9 is changed and is provided below.

Question #	Response Date
RAI 286 — 07.08-9	February 11, 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: BRYAN Martin (External RS/NB)
Sent: Tuesday, November 30, 2010 8:06 AM
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. 286, FSAR Ch. 7, Supplement 10

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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The RAI 286 Supplement 4 response on February 26, 2010 provided technically correct and complete responses to 1 of the remaining 4 questions. That submittal completed responses to 15 of the 18 questions. The RAI 286 Supplement 5 response on March 5, 2010 provided responses to 2 of the remaining 3 questions. The RAI 286 Supplement 6 response on April 16, 2010, Supplement 7 on May 28, 2010, Supplement 8 on June 30, 2010, and Supplement 9 on September 28, 2010, provided a revised response date for question 07.08-9.

To allow time to interact with the staff on this remaining question the response date is being revised. The schedule for technically correct and complete response to question 07.08-9 is changed and is provided below.

Question #	Response Date
RAI 286 — 07.08-9	January 13, 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: BRYAN Martin (External RS/NB)
Sent: Tuesday, September 28, 2010 3:25 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); PANNELL George (CORP/QP); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 9

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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The RAI 286 Supplement 4 response on February 26, 2010 provided technically correct and complete responses to 1 of the remaining 4 questions. That submittal completed responses to 15 of the 18 questions. The RAI 286 Supplement 5 response on March 5, 2010 provided responses to 2 of the remaining 3 questions. The RAI 286 Supplement 6 response on April 16, 2010, Supplement 7 on May 28, 2010, and Supplement 8 on June 30, 2010, provided a revised response date for question 07.08-9.

The schedule for technically correct and complete response to question 07.08-9 is changed and is provided below. It should be noted that this response date may be updated based on the outcome of future NRC and AREVA interactions on FSAR Chapter 7 topics.

Question #	Response Date
RAI 286 — 07.08-9	November 30, 2010

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: BRYAN Martin (EXT)
Sent: Wednesday, June 30, 2010 6:36 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (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 8

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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The RAI 286 Supplement 4 response on February 26, 2010 provided technically correct and complete responses to 1 of the remaining 4 questions. That submittal completed responses to 15 of the 18 questions. The RAI 286 Supplement 5 response on March 5, 2010 provided responses to 2 of the remaining 3 questions. The RAI 286 Supplement 6 response on April 16, 2010, and Supplement 7 on May 28, 2010, provided a revised response date for question 07.08-9. To allow time to continue to interact with the staff on this remaining question the response date is being revised.

The schedule for technically correct and complete responses to question 07.08-9 is changed and is provided below. It should be noted that this response date may be updated based on the outcome of future NRC and AREVA interactions on FSAR Chapter 7 topics.

Question #	Response Date
RAI 286 — 07.08-9	September 28, 2010

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: BRYAN Martin (EXT)
Sent: Friday, May 28, 2010 2:00 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (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 7

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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The RAI 286 Supplement 4 response on February 26, 2010

provided technically correct and complete responses to 1 of the remaining 4 questions. That submittal completed responses to 15 of the 18 questions. The RAI 286 Supplement 5 response on March 5, 2010 provided responses to 2 of the remaining 3 questions. The RAI 286 Supplement 6 response on April 16, 2010, provided a revised response date for question 07.08-9. To allow time to interact with the staff on this remaining question the response date is being revised.

The schedule for technically correct and complete responses to question 07.08-9 is changed and is provided below.

Question #	Response Date
RAI 286 — 07.08-9	June 30, 2010

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: BRYAN Martin (EXT)
Sent: Friday, April 16, 2010 3:41 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (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 6

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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The RAI 286 Supplement 4 response on February 26, 2010 provided technically correct and complete responses to 1 of the remaining 4 questions. That submittal completed responses to 15 of the 18 questions. The RAI 286 Supplement 5 response on March 5, 2010 provided responses to 2 of the remaining 3 questions.

The schedule for technically correct and complete responses to question 07.08-9 is changed and is provided below. The response date is revised to provide opportunities to interact with the NRC on the response.

Question #	Response Date
RAI 286 — 07.08-9	May 28, 2010

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Friday, March 05, 2010 5:38 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 5

Getachew,

The proprietary/SUNSI and public versions of the response to RAI No. 286, Supplement 5 are submitted via AREVA NP Inc. letter, "Response to U.S. EPR Design Certification Application RAI No. 286 Supplement 5 " NRC:10:018, dated March 5, 2010. The enclosure to that letter provides a technically correct and complete response to 2 of the 3 remaining questions in RAI No. 286. The RAI response also contains pages that were excerpted from a document containing security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390. In addition, an affidavit to support withholding of information that AREVA considers proprietary from public disclosure, per 10CFR2.390(b), is provided as an enclosure to that letter.

A public version with the proprietary and security-related sensitive information redacted is also provided as an enclosure to that letter.

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 Supplement 5, Question 07.09-46.

The following table indicates the respective pages in the response document that contains AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.09-46	2	24
RAI 286 — 07.09-49	25	25

The schedule for technically correct and complete response to the remaining question is unchanged and is provided below:

Question #	Response Date
RAI 286 — 07.08-9	April 16, 2010

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
Martin.Bryan@areva.com

From: BRYAN Martin (EXT)
Sent: Friday, February 26, 2010 4:01 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 4

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. AREVA NP submitted Supplement 3 to the response on February 19, 2010 to address 2 of the remaining 6 questions. The attached file, "RAI 286 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the remaining 4 questions.

The following table indicates the respective pages in the response document, "RAI 286 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 286 — 07.09-47	2	3

The schedule for technically correct and complete responses to the remaining 3 questions is unchanged and provided below:

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

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.
Tel: (434) 832-3016
Martin.Bryan@areva.com

From: DUNCAN Leslie E (AREVA NP INC)
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

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
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
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: 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,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
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: 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: 2518

Mail Envelope Properties (199EBB4D1CD9644D9472AA84D5D8EFA71C8B15)

Subject: Response to U.S. EPR Design Certification Application RAI No. 286, FSAR Ch. 7, Supplement 12
Sent Date: 2/8/2011 2:10:59 PM
Received Date: 2/8/2011 2:12:12 PM
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
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	26626	2/8/2011 2:12:12 PM
RAI 286 Supplement 12 Response US EPR DC.pdf	150683	

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

Response to

Request for Additional Information No. 286, Supplement 12 (3567, 3561, 3562, 3563), Revision 1

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 07.08-9:

Follow-up to RAI Question No. 07.08-4

Further justify why the Process Information and Control System (PICS) does not need to meet 10 CFR Part 50, Appendix A, General Design Criteria (GDC) 1.

GDC 1 requires, in part, that structures, systems and components important to safety shall be design, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. The staff identified throughout Chapter 7 of the U.S. EPR DC-FSAR that PICS is the system that the operators will normally use to monitor and control plant safety systems during all conditions of plant operation, "including normal operation, anticipated operational occurrences, postulated accidents, and beyond design basis events. Additionally, PICS provides functions that address the requirements of GDC 13 and 19 (e.g., post-accident monitoring), as well as diverse actuation functions provided there is a software common-cause failure. As such, the staff sees that PICS is an important to safety system and is required to meet GDC1. The staff requests that information be provided as to the quality standards that PICS will designed and tested. As one example, if PICS is credited for diverse actuation, AREVA NP should address the applicability of Generic Letter 85-06 and its enclosure as one potential standard/guidance. AREVA NP should also describe compliance to GDC 1 for systems that support PICS and enable its proper operation, such as the plant data network.

Response to Question 07.08-9:

As stated in the Response to RAI 75, Supplement 4, Question 07.08-04, the PICS is designed in accordance with a quality assurance program (QAP) that satisfies GL 85-06. U.S. EPR FSAR Tier 2, Section 7.1 will be revised to clarify this commitment to GL 85-06 for the PICS.

The PICS is the primary operator interface used in the plant conditions for the duration of its availability. This approach allows the operator to use the same human machine interface (HMI) interface to operate the plant equipment required to complete a task, regardless of the safety-related classification of individual functions performed or equipment operated. This method benefits plant safety because the probability for human errors resulting from continuous transitions between different operator interfaces is minimized. The PICS is not credited to perform any safety-related functions in the U.S. EPR FSAR Tier 2, Chapter 15 safety analysis for the U.S. EPR. Manual indications and controls needed to bring the plant to a safe shutdown following an event are available on the safety-related safety information and control system (SICS) if the PICS is not available.

Given AREVA NP's design approach for the PICS and understanding of the importance of the PICS system to overall plant operation, application of the additional quality requirements described in this response is appropriate and sufficient for this non-safety-related system.

Topical Report ANP-10266A describes the QAP for the U.S. EPR. Topical Report ANP-10266A, Addendum A defines the QAP for the non-safety-related U.S. EPR systems. This addendum addresses the eighteen topics contained in the enclosure to GL 85-06. The PICS, the plant data network, and the other non-safety-related instrumentation and controls (I&C) systems are designed under a QAP that satisfies GL 85-06.

In addition to the measures outlined in GL 85-06 and Topical Report ANP-10266A, Addendum A, other quality requirements are applied to the design of the PICS. These additional requirements reflect the importance of the PICS as the primary operator interface:

- The design of the PICS is accomplished through a phased approach, including the following (or equivalent) phases:
  - System requirements phase.
  - System design phase.
  - Software/hardware requirements phase.
  - Software/hardware design phase.
  - Software/hardware implementation phase.
  - Software/hardware validation phase.
  - System integration phase.
  - System validation phase.
- A criticality analysis is performed for the PICS software in accordance with accepted industrial practice.
- Verification and validation (V&V) of the PICS software is performed according to a V&V plan that is consistent with accepted industrial practice.
- The PICS requirements are documented in a traceable form that is under configuration management.
- The PICS design is validated through acceptance tests in the system validation (or equivalent) phase.

U.S. EPR FSAR Tier 2, Section 7.1 will be revised to reflect these requirements.

U.S. EPR FSAR Tier 1, Section 2.4.10 will be revised to include the PICS design phases.

In addition to quality assurance measures taken during the design of the PICS, AREVA NP recognizes how verifying correct functioning of the PICS on a periodic basis during plant operation is important to system quality. The Response to RAI 285, Supplement 3, Question 07.04-13 and its associated U.S. EPR FSAR markups describe the means for verifying correct functioning of the PICS during plant operation.

As described in the Response to RAI 56, Supplement 1, Question 07.09-30, the PICS employs redundancy for fault tolerance and is designed to industrial EMI/RFI standards.

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.4.10 and U.S. EPR FSAR Tier 2, Section 7.1 have been revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

2.4.10 Process Information and Control System

1.0 Description

The process information and control system (PICS) is a digital human machine interface (HMI). It provides monitoring and control of plant systems. The PICS is non-safety related and is provided in both the main control room (MCR) and the remote shutdown station (RSS).

07.08-9

2.0 I&C Design Features

2.1 The system hardware and software in the PICS is diverse from the safety-related system hardware and software in the Safety Information and Control System (SICS).

2.2 The PICS system design is accomplished through a phased approach which includes the following (or equivalent) phases:

1. System Requirements Phase.
2. System Design Phase.
3. Software/Hardware Requirements Phase.
4. Software/Hardware Design Phase.
5. Software/Hardware Implementation Phase.
6. Software/Hardware Validation Phase.
7. System Integration Phase.
8. System Validation Phase.

2.3 Deleted.

2.4 Electrical isolation is provided on PICS connections between the RSS and the MCR.

2.5 The capability to transfer control of the PICS from the MCR to the RSS exists in a fire area separate from the MCR and allows transfer of control without entry into the MCR.

3.0 System Inspections, Tests, Analyses, and Acceptance Criteria

Table 2.4.10-1 lists the PICS ITAAC.

07.08-9

Table 2.4.10-1—Process Information and Control System ITAAC (3 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The system hardware and software in the PICS is diverse from the safety-related system hardware and software in the SICS.	An analysis will be performed to demonstrate that the system hardware and software in the PICS is diverse from the safety-related system hardware and software in the SICS.	A report exists and concludes that the system hardware and software in the PICS is diverse from the safety-related system hardware and software in the SICS.
2.2	The PICS system design is accomplished through a phased approach which includes the following (or equivalent) phases: 1) System Requirements Phase. 2) System Design Phase. 3) Software/Hardware Requirements Phase. 4) Software/Hardware Design Phase. 5) Software/Hardware Implementation Phase. 6) Software/Hardware Validation Phase. 7) System Integration Phase. 8) System Validation Phase.	a. Analyses will be performed to verify that the outputs for the PICS system requirements phase conform to the requirements of that phase. **{{DAC}}** b. Analyses will be performed to verify that the outputs for the PICS system design phase conform to the requirements of that phase. **{{DAC}}** c. Analyses will be performed to verify that the outputs for the PICS software/hardware requirements phase conform to the requirements of that phase. **{{DAC}}** d. Analyses will be performed to verify that the outputs for the PICS software/hardware design phase conform to the requirements of that phase. **{{DAC}}** e. Analyses will be performed to verify that the outputs for the PICS software/hardware implementation phase conform to the requirements of that phase.	a. A report exists and concludes that the outputs for the PICS system requirements phase conform to the requirements of that phase. **{{DAC}}** b. A report exists and concludes that the outputs for the PICS system design phase conform to the requirements of that phase. **{{DAC}}** c. A report exists and concludes that the outputs for the PICS software/hardware requirements phase conform to the requirements of that phase. **{{DAC}}** d. A report exists and concludes that the outputs for the PICS software/hardware design phase conform to the requirements of that phase. **{{DAC}}** e. A report exists and concludes that the outputs for the PICS software/hardware implementation phase conform to the requirements of that phase.

07.08-9

Table 2.4.10-1—Process Information and Control System ITAAC (3 Sheets)

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		f. Analyses will be performed to verify that the outputs for the PICS software/hardware validation phase conform to the requirements of that phase.	f. A report exists and concludes that the outputs for the PICS software/hardware validation phase conform to the requirements of that phase.
		g. Analyses will be performed to verify that the outputs for the PICS system integration phase conform to the requirements of that phase.	g. A report exists and concludes that the outputs for the PICS system integration phase conform to the requirements of that phase.
		h. Analyses will be performed to verify that the outputs for the PICS system validation phase conform to the requirements of that phase.	h. A report exists and concludes that the outputs for the PICS system validation phase conform to the requirements of that phase.
2.3	Deleted.	Deleted.	Deleted.
2.4	Electrical isolation is provided on PICS connections between the RSS and the MCR.	a. Analyses will be performed to determine the test specification for electrical isolation devices on connections between the RSS and the MCR for the PICS.	a. A test plan exists that provides the test specification for determining whether a device is capable of preventing the propagation of credible electrical faults on connections between the RSS and the MCR for the PICS.
		b. Type tests, analyses, or a combination of type tests and analyses will be performed on the electrical isolation devices between the RSS and the MCR for the PICS.	b. A report exists and concludes that the isolation devices used between the RSS and the MCR for the PICS prevent the propagation of credible electrical faults.
		c. Inspections will be performed on connections between the RSS and the MCR for the PICS.	c. Electrical isolation devices exist on connections between the RSS and the MCR for the PICS.

The electrical power systems are described in detail in Chapter 8.

7.1.1.3.2 Process Information and Control System

The PICS is a modern, digital HMI. It allows the monitoring and control of process systems for the execution of required plant operations, including those required for abnormal and emergency situations. The PICS is provided in both the MCR and the RSS. View-only capabilities are provided in other areas of the plant as needed, including the technical support center (TSC) for support of emergency response operations.

This section describes the PICS with regards to I&C design. Details such as screen displays, levels of automation, and panel layout are designed using the HFE principles described in Chapter 18.

Classification

The PICS is classified as non-safety-related, augmented quality. ← 07.08-9

Functions

The PICS performs these functions:

- Monitoring and control of process systems during normal operation, including startup, power, and shutdown operation.
- Monitor the status of the automatic reactor trip and ESF systems during abnormal events, including anticipated operational occurrences (AOO), postulated accidents, and special events.
- Manual reset of automatic reactor trip and ESF actuation functions.
- Non-credited means to monitor and control systems required to achieve and maintain safe shutdown.
- Manual component level control of safety-related process systems via the process automation system (PAS) and priority and actuator control system (PACS).
- Manual actuation of critical safety functions via the DAS or PAS.
- Primary SPDS functions.
- Display of Type A-E PAM variables.
- Monitoring and control of systems required to mitigate severe accidents.
- Display bypassed and inoperable status of safety systems.
- Alarm management.

- Service equipment.

Equipment

The PICS is implemented with an industrial digital I&C and HMI platform.

The PUs consist of industrial computers. Operator workstations typically consist of computers, displays, and input devices (i.e., computer mice and keyboards). The operator may use several monitors that share input devices. These monitors display different plant functions, and the display content is interchangeable. The POP is a set of large panels that display an overview of plant and system status. Equipment such as network switches and electrical and fiber optic cable are provided to support data communications.

The plant annunciator is integrated into the PICS operating and monitoring system. Special screens display and organize alarms and warnings based on their status and relative level of importance. An alarm hierarchy with a color coding system is used to immediately alert the operator of the importance of the alarm based on the relevance to plant safety.

The PICS is used to control both safety-related and non-safety-related process systems. The PICS implements these measures to preclude spurious actuation of plant equipment:

- Operation of plant equipment is performed using a two-step process. A single mouse click on a component is followed by a verification step requiring a second single mouse click, so a single inadvertent action by the operator does not result in a command signal.

- Touch screen displays are not used.

Qualification Requirements

07.08-9

In the unlikely event of a software common cause failure of the PS, the PICS equipment must function properly under conditions during and following design basis events. The PICS equipment is located in Safeguard Buildings that provide a mild environment during and following design basis events. Equipment selected for use in the PICS will be rated by the manufacturer (or otherwise reasonably expected) to operate under the mild environmental conditions expected to exist at its location during the events that the equipment is expected to be used.

Quality Requirements

In its role as the primary operator interface, and as a system relied on to mitigate the effects of CCF of the PS, the PICS is required to be of sufficient quality to perform its functions in a reliable manner. The PICS is designed using a robust engineering

07.08-9

process with appropriate reviews, verifications, tests, and approvals. Sufficient quality is achieved in the design of the PICS through the following measures:

- The PICS is designed, fabricated, erected, and tested under the quality assurance program described in Topical Report ANP-1066A, Addendum A (Reference 42). This quality assurance program is consistent with the guidance of Generic Letter 85-06 (Reference 43).
- The design of the PICS is accomplished through a phased approach, including the following (or equivalent) phases:
  - System requirements phase.
  - System design phase.
  - Software/hardware requirements phase.
  - Software/hardware design phase.
  - Software/hardware implementation phase.
  - Software/hardware validation phase.
  - System integration phase.
  - System validation phase.
- A criticality analysis is performed for the PICS software in accordance with accepted industrial practice.
- Verification and validation (V&V) of the PICS software is performed according to a V&V plan that is consistent with accepted industrial practice.
- PICS requirements are documented in a traceable form that is under configuration management.
- The PICS design is validated through acceptance test in the system validation (or equivalent) phase.

Diversity Requirements

The PICS is credited by the defense-in-depth and diversity analysis described in Section 7.8. Diversity requirements for the PICS are identified in Reference 8:

- The PICS displays are diverse from the SICS displays (QDS).

Data Communications

The PUs transmit data to and receive data from the Level 1 I&C systems via the plant data network. The PUs, operator workstations, POP, and XUs exchange data via the

Other types of data connections may be implemented within the same division of the NIS and the PAS.

The TIS and BPS are not divisionalized. Other types of data connections may be implemented within the TIS and BPS.

Power Supply

The various subsystems of the PAS have different power supplies.

The NIS is powered from the 12hr UPS. The 12hr UPS provides backup power with 12-hour batteries and the SBODGs in the event of a LOOP.

The TIS and the BPS are powered from the non-Class 1E uninterruptible power supply (NUPS). The NUPS provides backup power with 2-hour batteries and the SBODGs in the event of a LOOP.

The electrical power systems are described in detail in Chapter 8.

7.1.1.4.7 Diverse Actuation System (DAS)

The DAS is the non-safety-related I&C system that provides diverse actuation of protective functions in the unlikely event of an ATWS or a software common cause failure of the PS.

Classification

The DAS is classified as non-safety related, augmented quality. 07.08-9

Functions

The DAS performs automatic risk-reduction functions, including:

- Mitigation of ATWS and PS software common cause failure.
- Manual, system-level actuation of critical safety functions.
- Mitigation of SBO.
- Mitigation of other risk significant events.

Architecture

Figure 7.1-13—Diverse Actuation System Architecture provides a functional representation of the DAS.

The DAS is organized into four redundant divisions located in separate Safeguards Buildings. Each division of the DAS contains a diverse actuation unit (DAU).

Hardwired signals are acquired from the PS, as described in Section 7.1.1.6.4, and compared to a setpoint. Fiber optic data connections are provided to share trip requests, and two-out-of-four voting is done in each DAU. Outputs are sent to the PACS via hardwired connections.

The DAUs interface with the PICS via the plant data network to display information.

Equipment

The DAS is implemented with an industrial digital I&C platform.

The DAS generally consists of subracks, I/O modules, function processors, communication modules, and link modules. Fiber optic and copper cable is used for the various data and hardwired connections. Specialized components may be used.

Qualification Requirements

In the unlikely event of a software common cause failure of the PS, the DAS equipment must function properly under conditions during and following design basis events. The DAS equipment is located in Safeguard Buildings that provide a mild environment during and following design basis events. Equipment selected for use in the DAS shall be rated by the manufacturer (or otherwise reasonably expected) to operate under the mild environmental conditions expected to exist at its location during the events for which the equipment is expected to respond.

Quality Requirements

07.08-9

As a system relied on to mitigate the effects of CCF of the PS, the DAS is required to be of sufficient quality to perform its functions in a reliable manner. The DAS is therefore designed using a robust engineering process with appropriate reviews, verification, tests, and approvals. Sufficient quality is achieved in the design of the DAS through the following measures:

07.08-9

- The DAS is designed, fabricated, erected, and tested under the quality assurance program described in Topical Report ANP-1066A, Addendum A (Reference 42). This quality assurance program is consistent with the guidance of Generic Letter 85-06 (Reference 43).
- The design of the DAS is accomplished through a phased approach including the following (or equivalent) phases:
  - System requirements phase.
  - System design phase.
  - Software/hardware requirements phase.

- Software/hardware design phase.
- Software/hardware implementation phase.
- Software/hardware validation phase.
- System integration phase.
- System validation phase.

- A criticality analysis is performed for the DAS software in accordance with accepted industrial practice.
- Verification and validation (V&V) of the DAS software is performed according to a V&V plan that is consistent with accepted industrial practice.
- DAS requirements are documented in a traceable form that is under configuration management.
- The DAS design is validated through acceptance test in the system validation (or equivalent) phase.

07.08-9

Diversity Requirements

The DAS is credited by the defense-in-depth and diversity analysis described in Section 7.8. Diversity requirements for DAS are described in Reference 8:

Data Communications

The DAS interfaces with the PICS via the plant data network and implements point-to-point data connections between the DAUs for voting purposes.

Other types of data communications may be implemented within the same division in the DAS.

Power Supply

The DAS is powered from the 12-UPS. The 12-UPS provides backup power with 12-hour batteries and the SBODGs in the event of a LOOP.

7.1.1.5 Level 0 - Process Interface

The process interface level includes components such as sensors, actuators, and switchgear.

The majority of the process interface equipment is included within the mechanical and electrical process systems that the I&C systems monitor and control. These systems are described in Chapter 5, Chapter 6, Chapter 8, Chapter 9, Chapter 10 and Chapter

34. BTP 7-17, "Guidance on Self-Test and Surveillance Test Provisions," U.S. Nuclear Regulatory Commission, Standard Review Plan, Branch Technical Position, Rev. 3, March 2007.

35. BTP 7-18, "Guidance on the Use of Programmable Logic Controllers in Digital Computer-Based Instrumentation and Control Systems," U.S. Nuclear Regulatory Commission, Standard Review Plan, Branch Technical Position, Rev. 3, March 2007.

36. BTP 7-19, "Guidance for Evaluation of Diversity and Defense-In-Depth in Digital Computer-Based Instrumentation and Control Systems," U.S. Nuclear Regulatory Commission, Standard Review Plan, Branch Technical Position, Rev. 3, March 2007.

37. BTP 7-21, "Guidance on Digital Computer Real-Time Performance," U.S. Nuclear Regulatory Commission, Standard Review Plan, Branch Technical Position, Rev. 3, March 2007.

38. BTP 5-2, "Overpressurization Protection of Pressurized-Water Reactors While Operating at Low Temperatures," U.S. Nuclear Regulatory Commission, Standard Review Plan, Branch Technical Position, Rev. 3, March 2007.

39. EMF-2341(P), Revision 1, "Generic Strategy for Periodic Surveillance Testing of TELEPERM™ XS Systems in U.S. Nuclear Generating Stations," Siemens Power Corporation, March 2000.

40. EPRI TR-106439, "Guidance on Evaluation and Acceptance of Commercial Grade Digital Equipment for Nuclear Safety Applications," Electric Power Research Institute, October 1996.

41. Deleted. ~~ISA-TR67.04.09-2005, "Graded Approaches to Setpoint Determination," The Instrumentation, Systems, and Automation Society, October 2005.~~

07.08-9

42. ANP-10266A, Revision 1, "AREVA NP Inc. Quality Assurance Plan (QAP) for Design Certification of the U.S. EPR Topical Report," AREVA NP Inc., April 2007.

43. Generic Letter 85-06, "Quality Assurance Guidance for ATWS Equipment that is Not Safety-Related," U.S. Nuclear Regulatory Commission, April 16, 1985.

Next File