ArevaEPRDCPEm Resource

From: WELLS Russell (AREVA) [Russell.Wells@areva.com]
Sent: Thursday, March 24, 2011 1:36 PM
To: Tesfaye, Getachew
Cc: CORNELL Veronica (EXTERNAL AREVA); BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 10
Attachments: RAI 248 Supplement 10 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009, to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009, to address 8 of the remaining 18 questions. AREVA NP submitted Supplement 3 to the response on December 18, 2009, to address 8 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on February 25, 2010, to address 1 of the remaining 2 questions. AREVA NP submitted Supplement 5 to the response on June 24, 2010, to provide a revised schedule for responding to Question 03.07.02-51. AREVA NP submitted Supplement 6 on July 15, 2010, to provide an INTERIM response to Question 03.07.02-51. AREVA NP submitted Supplement 7 on July 30, 2010, to provide a revised response to Question 03.07.02-55. On January 19, 2011, AREVA NP submitted Supplement 8 to provide a final response to Question 03.07.02-51. On March 7, 2011, AREVA submitted Supplement 9 to provide a revised response to Question 03.08.01-33.

The attached file, "RAI 248 Supplement 9 Response US EPR DC.pdf" provides a technically correct and complete response to question 03.08.01-33, as committed.

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 248 Question 03.08.01-33.

The following table indicates the respective pages in the response document, "RAI 248 Supplement 9 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 248 — 03.08.01-33	2	3

The final response to Question 03.08.01-35 was submitted in RAI 248 Supplement 1 on September 29, 2009. To address NRC comments received during the U.S. EPR FSAR Section 3.8 audit held February 14 – 17, 2011, the response to Question 03.08.01-35 is being revised.

The schedule for the revised response to Question 03.08.01-35 is provided below:

Question #	Response Date
RAI 248 — 03.08.01-35	April 26, 2011

Sincerely,

Russ Wells
U.S. EPR Design Certification Licensing Manager
AREVA NP, Inc.
3315 Old Forest Road, P.O. Box 10935

Mail Stop OF-57
Lynchburg, VA 24506-0935
Phone: 434-832-3884 (work)
434-942-6375 (cell)
Fax: 434-382-3884
Russell.Wells@Areva.com

From: WELLS Russell (RS/NB)
Sent: Monday, March 07, 2011 6:19 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 9

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009, to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009, to address 8 of the remaining 18 questions. AREVA NP submitted Supplement 3 to the response on December 18, 2009, to address 8 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on February 25, 2010, to address 1 of the remaining 2 questions. AREVA NP submitted Supplement 5 to the response on June 24, 2010, to provide a revised schedule for responding to Question 03.07.02-51. AREVA NP submitted Supplement 6 on July 15, 2010, to provide an INTERIM response to Question 03.07.02-51. AREVA NP submitted Supplement 7 on July 30, 2010, to provide a revised response to Question 03.07.02-55. On January 19, 2011, AREVA NP submitted Supplement 8 to provide a final response to Question 03.07.02-51.

The final response to Question 03.08.01-33 was submitted in RAI 248 Supplement 1, September 29, 2009. To address NRC comments received during the U.S. EPR FSAR Section 3.8 audit held February 14 – 17, 2011, the response to Question 03.08.01-33 is being revised.

The schedule for the revised response to Question 03.08.01-33 is provided below:

Question #	Response Date
RAI 248 — 03.08.01-33	April 26, 2011

Sincerely,

Russ Wells
U.S. EPR Design Certification Licensing Manager
AREVA NP, Inc.
3315 Old Forest Road, P.O. Box 10935
Mail Stop OF-57
Lynchburg, VA 24506-0935
Phone: 434-832-3884 (work)
434-942-6375 (cell)
Fax: 434-382-3884
Russell.Wells@Areva.com

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, January 19, 2011 1:19 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009, to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009, to address 8 of the remaining 18 questions. AREVA NP submitted Supplement 3 to the response on December 18, 2009, to address 8 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on February 25, 2010, to address 1 of the remaining 2 questions. AREVA NP submitted Supplement 5 to the response on June 24, 2010, to provide a revised schedule for responding to Question 03.07.02-51. AREVA NP submitted Supplement 6 on July 15, 2010, to provide an INTERIM response to Question 03.07.02-51. AREVA NP submitted Supplement 7 on July 30, 2010, to provide a revised response to Question 03.07.02-55.

The attached file, "RAI 248 Supplement 8 Response US EPR DC.pdf" provides a technically correct and complete response to the remaining question, as committed.

The following table indicates the respective pages in the response document, "RAI 248 Supplement 8 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 248 — 03.07.02-51	2	3

This concludes the formal AREVA NP response to RAI 248, 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 (EXT)
Sent: Friday, July 30, 2010 4:50 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009, to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009, to address 8 of the remaining 18 questions. AREVA NP submitted Supplement 3 to the response on December 18, 2009, to address 8 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on February

25, 2010, to address 1 of the remaining 2 questions. AREVA NP submitted Supplement 5 to the response on June 24, 2010, to provide a revised schedule for responding to Question 03.07.02-51. AREVA NP submitted Supplement 6 on July 15, 2010, to provide an INTERIM response to Question 03.07.02-51.

As a result of the civil/structural re-planning activities, the attached file, "RAI 248 Supplement 7 Response US EPR DC.pdf" provides a revised response to Question 03.07.02-55.

The following table indicates the respective pages in the response document, "RAI 248 Supplement 7 Response US EPR DC.pdf," that contain AREVA NP's revised response to the subject question.

Question #	Start Page	End Page
RAI 248 — 03.07.02-55	2	2

The schedule for technically correct and complete FINAL response to the remaining 1 question is unchanged and provided below:

Question #	Response Date
RAI 248 — 03.07.02-51	January 20, 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 (EXT)
Sent: Thursday, July 15, 2010 11:31 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009, to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009, to address 8 of the remaining 18 questions. AREVA NP submitted Supplement 3 to the response on December 18, 2009, to address 8 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on February 25, 2010, to address 1 of the remaining 2 questions. AREVA NP submitted Supplement 5 to the response on June 24, 2010, to provide a revised schedule for responding to this question based on the June 9, 2020, NRC public meeting with AREVA but this response addressed 0 of the remaining 1 remaining questions. The attached file, "RAI 248 Question 03.07.02-51 Response US EPR DC – INTERIM.pdf" provides technically correct and complete INTERIM response to the remaining 1 question, as committed.

The following table indicates the respective pages in the response document, "RAI 248 Question 03.07.02-51 Response US EPR DC – INTERIM.pdf," that contain AREVA NP's INTERIM response to the subject question.

Question #	Start Page	End Page
RAI 248 — 03.07.02-51	2	2

The schedule for technically correct and complete FINAL response to the remaining 1 question is unchanged and provided below:

Question #	Response Date
RAI 248 — 03.07.02-51	January 20, 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 (EXT)
Sent: Thursday, June 24, 2010 12:24 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); CORNELL Veronica (EXT); VAN NOY Mark (EXT); RYAN Tom (AREVA NP INC); GARDNER George Darrell (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 5

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009 to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009 to address 8 of the remaining 18 questions. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to address 8 of the remaining 10 questions. AREVA NP submitted Supplement 4 to the response on February 25, 2010 to address 1 of the remaining 2 questions.

Based upon the civil/structural re-planning activities and revised RAI response schedule presented to the NRC during the June 9, 2010, Public Meeting, and to allow time to interact with the NRC on the responses, the schedule for the remaining question has been changed.

Prior to submittal of the final RAI response, AREVA NP will provide an interim RAI response that includes:

(1) a description of the technical work (e.g., methodology)
(2) U.S. EPR FSAR revised pages, as applicable

The revised schedule for an interim response and the technically correct and complete response to these questions is provided below.

Question #	Interim Response Date	Final Response Date
RAI 248 — 03.07.02-51	July 16, 2010	January 20, 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 (EXT)
Sent: Thursday, February 25, 2010 5:58 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); VAN NOY Mark (EXT); DUNCAN Leslie E (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009 to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009 to address 8 of the remaining 18 questions. AREVA NP submitted Supplement 3 to the response on December 18, 2009 to address 8 of the remaining 10 questions. The attached file, "RAI 248 Supplement 4 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the remaining 2 questions.

One response, RAI 248 Question 03.07.02-51, has been deferred because supporting analysis work remains in progress. The seismic analysis associated with an embedded finite element model (FEM) that includes detailed modeling of walls and floors is being evaluated for potential cracked concrete effects and is interdependent with other RAI responses.

The following table indicates the respective pages in the response document, "RAI 248 Supplement 4 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 248 — 03.07.02-50	2	2

The schedule for technically correct and complete responses to the remaining 1 question has been changed and is provided below:

Question #	Response Date
RAI 248 — 03.07.02-51	August 13, 2010

Sincerely,

Martin (Marty) C. Bryan
Licensing Advisory Engineer
AREVA NP Inc.

Tel: (434) 832-3016
Martin.Bryan.ext@areva.com

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, December 18, 2009 4:23 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009 to address 5 of the remaining 23 questions. AREVA NP submitted Supplement 2 to the response on November 18, 2009 to address 8 of the remaining 18 questions. The attached file, "RAI 248 Supplement 3 Response US EPR DC.pdf" provides technically correct and complete responses to 8 of the remaining 10 questions, as committed. Two responses, RAI 248, Questions 03.07.02-50 and 03.08.01-51, have been deferred because supporting analysis work remains in progress.

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 248 Questions 03.07.01-25, 03.07.02-48 and 03.08.01-36.

The following table indicates the respective pages in the response document, "RAI 248 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 248 – 03.07.01-25	2	8
RAI 248 – 03.07.02-43	9	24
RAI 248 – 03.07.02-44	25	26
RAI 248 – 03.07.02-46	27	28
RAI 248 – 03.07.02-47	29	30
RAI 248 – 03.07.02-48	31	31
RAI 248 – 03.07.02-54	32	32
RAI 248 – 03.08.01-36	33	34

The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Response Date
RAI 248 – 03.07.02-50	March 2, 2010
RAI 248 – 03.07.02-51	March 2, 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: WELLS Russell D (AREVA NP INC)
Sent: Wednesday, November 18, 2009 7:25 PM
To: 'Getachew Tesfaye'
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. 248, FSAR Ch 3, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. AREVA NP submitted Supplement 1 to the response on September 29, 2009 to address 5 of the remaining 23 questions. The attached file, "RAI 248 Supplement 2 Response US EPR DC.pdf" provides technically correct and complete responses to 8 of the remaining 18 questions, as committed. Two responses, RAI 248, Questions 03.07.02-44 and 03.08.01-36, have been deferred because supporting analysis work remains in progress.

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 248 Questions 03.04.02-12, 03.07.02-53, 03.07.02-56, and 03.07.02-57.

The following table indicates the respective pages in the response document, "RAI 248 Supplement 2 Response US EPR DC.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 03.04.02-12	2	2
RAI 03.07.02-45	3	3
RAI 03.07.02-49	4	4
RAI 03.07.02-52	5	5
RAI 03.07.02-53	6	8
RAI 03.07.02-56	9	12
RAI 03.07.02-57	13	14
RAI 03.08.04-7	15	15

The schedule for technically correct and complete responses to the remaining 10 questions has been changed and provided below:

Question #	Response Date
RAI 03.07.01-25	December 18, 2009
RAI 03.07.02-43	December 18, 2009
RAI 03.07.02-44	**January 28, 2010**
RAI 03.07.02-46	December 18, 2009
RAI 03.07.02-47	December 18, 2009
RAI 03.07.02-48	December 18, 2009
RAI 03.07.02-50	December 18, 2009
RAI 03.07.02-51	December 18, 2009
RAI 03.07.02-54	December 18, 2009
RAI 03.08.01-36	**January 28, 2010**

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, September 29, 2009 7:16 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, Ch. 3, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 2 of the 25 questions of RAI No. 248 on August 14, 2009. The attached file, "RAI 248 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 5 of the remaining 23 questions. One response, RAI 248, Question 03.08.04-7, has been deferred because a supporting FSAR change remains in progress.

The following table indicates the respective pages in the response document, "RAI 248 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 03.07.02-58	2	7
RAI 03.08.01-33	8	9
RAI 03.08.01-34	10	15
RAI 03.08.01-35	16	16
RAI 03.08.03-19	17	18

The schedule for technically correct and complete responses to the remaining 18 questions has been changed and is provided below:

Question #	Response Date
RAI 03.04.02-12	November 18, 2009
RAI 03.07.01-25	December 18, 2009
RAI 03.07.02-43	December 18, 2009
RAI 03.07.02-44	November 18, 2009
RAI 03.07.02-45	November 18, 2009
RAI 03.07.02-46	December 18, 2009
RAI 03.07.02-47	December 18, 2009
RAI 03.07.02-48	December 18, 2009

RAI 03.07.02-49	November 18, 2009
RAI 03.07.02-50	December 18, 2009
RAI 03.07.02-51	December 18, 2009
RAI 03.07.02-52	November 18, 2009
RAI 03.07.02-53	November 18, 2009
RAI 03.07.02-54	December 18, 2009
RAI 03.07.02-56	November 18, 2009
RAI 03.07.02-57	November 18, 2009
RAI 03.08.01-36	November 18, 2009
RAI 03.08.04-7	November 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: Pederson Ronda M (AREVA NP INC)
Sent: Friday, August 14, 2009 5:05 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 248, Ch. 3

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 248 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the 25 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 248 Question 03.07.02-55.

The following table indicates the respective pages in the response document, "RAI 248 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 03.04.02-12	2	2
RAI 03.07.01-25	3	3
RAI 03.07.02-43	4	4
RAI 03.07.02-44	5	5
RAI 03.07.02-45	6	6
RAI 03.07.02-46	7	7

RAI 03.07.02-47	8	9
RAI 03.07.02-48	10	10
RAI 03.07.02-49	11	11
RAI 03.07.02-50	12	12
RAI 03.07.02-51	13	13
RAI 03.07.02-52	14	14
RAI 03.07.02-53	15	16
RAI 03.07.02-54	17	17
RAI 03.07.02-55	18	20
RAI 03.07.02-56	21	22
RAI 03.07.02-57	23	23
RAI 03.07.02-58	24	24
RAI 03.08.01-32	25	25
RAI 03.08.01-33	26	26
RAI 03.08.01-34	27	27
RAI 03.08.01-35	28	28
RAI 03.08.01-36	29	29
RAI 03.08.03-19	30	30
RAI 03.08.04-7	31	31

A complete answer is not provided for 23 of the 25 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 03.04.02-12	November 18, 2009
RAI 03.07.01-25	December 18, 2009
RAI 03.07.02-43	December 18, 2009
RAI 03.07.02-44	November 18, 2009
RAI 03.07.02-45	November 18, 2009
RAI 03.07.02-46	December 18, 2009
RAI 03.07.02-47	December 18, 2009
RAI 03.07.02-48	December 18, 2009
RAI 03.07.02-49	November 18, 2009
RAI 03.07.02-50	December 18, 2009
RAI 03.07.02-51	December 18, 2009
RAI 03.07.02-52	November 18, 2009
RAI 03.07.02-53	November 18, 2009
RAI 03.07.02-54	December 18, 2009
RAI 03.07.02-56	November 18, 2009
RAI 03.07.02-57	November 18, 2009
RAI 03.07.02-58	September 29, 2009
RAI 03.08.01-33	September 29, 2009
RAI 03.08.01-34	September 29, 2009
RAI 03.08.01-35	September 29, 2009
RAI 03.08.01-36	November 18, 2009

RAI 03.08.03-19	September 29, 2009
RAI 03.08.04-7	September 29, 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: Tuesday, July 14, 2009 7:50 PM
To: ZZ-DL-A-USEPR-DL
Cc: Candra, Hernando; Chakravorty, Manas; Xu, Jim; Patel, Jay; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 248(2934,3030,3034,3098,3099,3100), Ch. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on June 18, 2009, and discussed with your staff on July 14, 2009. No changes were made to the draft RAI questions 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: 2746

Mail Envelope Properties (1F1CC1BBDC66B842A46CAC03D6B1CD4104246FEE)

Subject: Response to U.S. EPR Design Certification Application RAI No. 248, FSAR Ch 3, Supplement 10
Sent Date: 3/24/2011 1:35:35 PM
Received Date: 3/24/2011 1:35:39 PM
From: WELLS Russell (AREVA)

Created By: Russell.Wells@areva.com

Recipients:
"CORNELL Veronica (EXTERNAL AREVA)" <Veronica.Cornell.ext@areva.com>
Tracking Status: None
"BENNETT Kathy (AREVA)" <Kathy.Bennett@areva.com>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
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Response to

Request for Additional Information No. 248, Supplement 10, Revision 1

7/14/2009

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.04.02 - Analysis Procedures
SRP Section: 03.07.01 - Seismic Design Parameters
SRP Section: 03.07.02 - Seismic System Analysis
SRP Section: 03.08.01 - Concrete Containment
SRP Section: 03.08.03 - Concrete and Steel Internal Structures of Steel or Concrete Containments
SRP Section: 03.08.04 - Other Seismic Category I Structures

Application Section: FSAR Ch 3

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

Question 03.08.01-33:

Follow-up to RAI Question 3.8.1-14

The applicant provided additional information to address temperature effects through the RCB wall. The following additional information is needed to resolve this RAI:

1. Provide the technical basis for stating that it is not credible that both the accidental temperature in the RCB and the minimum annulus temperature will occur at the same time. The applicant states that the response to RAI 3.8.1-16 (scheduled for submission on 5/29/09), will provide information on the effect of annulus temperature variation relative to the 79F value used to date. The staff will review this information when available to determine if it will resolve this issue.
2. Provide the technical basis for the 1000-hr steel relaxation percentage used for the determination of steel relaxation in the tendons. The staff has observed that some text book steel relaxation values show increases for temperatures above 68F much greater than the 50% assumed in the RAI response (Reference: Figure 2-15 in "Modern Prestressed Concrete" by James R. Libby, 4th Edition, Van Nostrand Reinhold, 1990).
3. With regard to Figure 3.8.1-14, provided with the RAI response, clarify the location of the vertical/gamma and hoop tendons and the magnitude of the temperatures reported in the discussion related to this figure at the tendon locations.

Response to Question 03.08.01-33:

1. This response to this question will be addressed in a supplemental Response to RAI 306, Question 03.08.01-39.

2. After reviewing the post-tensioning calculation and "Modern Prestressed Concrete" by James R. Libby, the steel relaxation value for a temperature of 68°F was increased by 150 percent instead of the 50 percent originally reported. This produces a 1000-hr steel relaxation value of (1.7 percent)*(2.5) = 4.25 percent at 117.5°F, which is considered in the design.

   Modification of steel relaxation percentages discussed herein has been incorporated into the associated analytical models. Documents using results from this model will be updated and available for NRC review. U.S. EPR FSAR Tier 2, Table 3.8-5 will be updated to include the revised effective tendon stresses.

3. Figure 3.8.1-14 provided in the Response to RAI 155, Question 3.8.1-14, shows that the vertical/gamma tendons are located approximately 0.525 meters from the interior face of the Reactor Containment Building (RCB) wall to the center of the tendons, and in one year, the tendon temperature following a loss of coolant accident (LOCA) is approximately 44°C (111°F). The hoop tendons are located approximately 0.75 meters and 1.05 meters from the interior face of the RCB wall to the center of the tendons, and in one year, the average tendon temperature following a LOCA is approximately (41°C + 38°C)/2 = 39.5°C (103°F).

FSAR Impact:

U.S. EPR FSAR Tier 2, Table 3.8-5 will be revised as described in the response and indicated on the enclosed markup

U.S. EPR Final Safety Analysis Report Markups

Table 3.8-5—Tendon Losses and Effective Forces with Time

03.08.01-33

Description		Hoop Tendons				Vertical Tendons				Gamma Tendons			
		T = zero[1] (plant startup)		T = 60 years[1] (plant shutdown)		T = zero[1] (plant startup)		T = 60 years[1] (plant shutdown)		T = zero[1] (plant startup)		T = 60 years[1] (plant shutdown)	
		Value (ksi)	% loss[2]	Value (ksi)	% loss[2]	Value (ksi)	% loss[2]	Value (ksi)	% loss[2]	Value (ksi)	% loss[2]	Value (ksi)	% loss[2]
Tension at lock off	$f_{p\text{-}ini}$	197.10	N/A	197.10	N/A	197.10	N/A	197.10	N/A	197.10	N/A	197.10	N/A
Loss due to friction	$\Delta f_{p\text{-}fr}$	-42.85-~~49.38~~	-21.7%-~~25.1%~~	-42.85-~~49.38~~	-21.7%-~~25.1%~~	-5.54-~~9.66~~	-2.8%-~~4.9%~~	-5.54-~~9.66~~	-2.8%-~~4.9%~~	-4.95-~~43.81~~	-2.5%-~~22.2%~~	-4.95-~~43.81~~	-2.5%-~~22.2%~~
Loss due to elastic shortening	$\Delta f_{p\text{-}es}$	-7.46-~~6.50~~	-3.8%-~~3.3%~~	-7.46-~~6.50~~	-3.8%-~~3.3%~~	-3.35-~~3.17~~	-1.7%-~~1.6%~~	-3.35-~~3.17~~	-1.7%-~~1.6%~~	-4.59-~~4.57~~	-2.3%	-4.59-~~4.57~~	-2.3%
Loss due to creep	$\Delta f_{p\text{-}cr}$	-16.24-~~13.44~~	-8.2%-~~6.5%~~	-17.92-~~19.88~~	-9.1%-~~10.1%~~	-9.80-~~7.28~~	-5.0%-~~3.7%~~	-10.92	-5.5%	-15.05-~~12.72~~	-7.6%-~~6.5%~~	-16.71-~~18.22~~	-8.5%-~~9.2%~~
Loss due to shrinkage	$\Delta f_{p\text{-}sh}$	-5.60-~~3.36~~	-2.8%-~~1.7%~~	-5.60-~~11.20~~	-2.8%-~~5.7%~~	-5.60-~~3.36~~	-2.8%-~~1.7%~~	-5.60-~~11.20~~	-2.8%-~~5.7%~~	-5.47-~~3.65~~	-2.8%-~~1.9%~~	-5.60-~~11.77~~	-2.8%-~~6.0%~~
Loss due to steel relaxation	$\Delta f_{p\text{-}sr}$	-9.45-~~7.88~~	-4.8%-~~4.0%~~	-11.96-~~9.86~~	-6.1%-~~5.0%~~	-12.12-~~7.88~~	-6.2%-~~4.0%~~	-15.34-~~9.86~~	-7.8%-~~5.0%~~	-12.08-~~7.88~~	-6.1%-~~4.0%~~	-15.29-~~9.86~~	-7.8%-~~5.0%~~
Sum of all losses	$\Sigma\Delta f_p$	-81.60-~~80.56~~	-41.3%-~~40.9%~~	-85.79-~~96.82~~	-43.5%-~~49.2%~~	-36.41-~~31.35~~	-18.5%-~~15.9%~~	-40.75-~~44.81~~	-20.7%-~~22.7%~~	-42.14-~~72.63~~	-21.4%-~~36.9%~~	-47.14-~~88.23~~	-23.9%-~~44.7%~~
Effective Post Tension	$f_{p\text{-}eff}$	115.50~~116.54~~	N/A ~~59.1%~~	111.31~~100.28~~	N/A ~~50.8%~~	160.69 ~~165.75~~	N/A ~~84.1%~~	156.35-~~152.29~~	N/A ~~77.3%~~	154.96~~124.47~~	N/A ~~63.1%~~	149.96~~108.87~~	N/A ~~55.3%~~

Note:

1. To account for the length of the construction period and the relative ages of the RCB wall, dome and tendons, the tendon losses above assumed that at "T=zero (plant startup)," the age of the tendons is 4.0 years, the age of the RCB dome is 4.1 years, and the age of the RCB wall is 5.0 years.

2. The "% loss" values are calculated relative to the tension at lock off (197.10 ksi).

03.08.01-33