

ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Thursday, May 30, 2013 6:15 PM
To: Snyder, Amy
Cc: Ford, Tanya; ANDERSON Katherine (EXTERNAL AREVA); DELANO Karen (AREVA); HONMA George (EXTERNAL AREVA); LEIGHLITER John (AREVA); LEWIS Ray (EXTERNAL AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); SHEPHERD Tracey (AREVA); VANCE Brian (AREVA); NOXON David (AREVA); RITCHEY Calvin (AREVA); GUCWA Len (EXTERNAL AREVA)
Subject: Advanced Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Question 19-328
Attachments: Advanced Response to RAI 289 Question 19-328 US EPR DC.pdf

Amy,

Attached is an Advanced Response for RAI 289, Question 19-328 in advance of the July 30, 2013 final date.

To keep our commitment to send a final response to this question by the commitment date, we need to receive all NRC staff feedback and comments no later than **July 16, 2013**.

Please let me know if NRC staff has any questions or if the response to this question can be sent as final.

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, June 06, 2012 8:43 AM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 17

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, Supplement 9 on March 29, 2011, Supplement 10 on May 6, 2011, Supplement 11 on June 17, 2011, Supplement 12 on October 18 2011, Supplement 13 on November 17, 2011, Supplement 14 on December 13, 2011, Supplement 15 on January 24, 2012, and Supplement 16 on February 26, 2012 to provide an updated schedule for the response.

The schedule for technically correct and complete responses to the remaining 2 questions has been changed as shown below. This schedule was transmitted to the NRC in AREVA NP letter NRC:12:024 dated May 10, 2012.

Question #	Response Date
RAI 289 — 19-328	July 30, 2013
RAI 289 — 19-329	July 30, 2013

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Sunday, February 26, 2012 5:10 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 16

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, Supplement 9 on March 29, 2011, Supplement 10 on May 6, 2011, Supplement 11 on June 17, 2011, Supplement 12 on October 18 2011, Supplement 13 on November 17, 2011, Supplement 14 on December 13, 2011, and Supplement 15 on January 24, 2012 to provide an updated schedule for the response.

The schedule for technically correct and complete responses to the remaining 2 questions has been changed as provided below. This schedule was transmitted to the NRC in AREVA NP letter NRC:12:008 dated February 21, 2012.

Question #	Response Date
RAI 289 — 19-328	August 30, 2013
RAI 289 — 19-329	August 30, 2013

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Tuesday, January 24, 2012 5:08 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); NOXON David (RS/NB); Michael.Miernicki@nrc.gov; tanya.ford@nrc.gov
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 15

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, Supplement 9 on March 29, 2011, Supplement 10 on May 6, 2011, Supplement 11 on June 17, 2011, Supplement 12 on October 18, 2011, Supplement 13 on November 17, 2011, and Supplement 14 on December 13, 2011 to provide an updated schedule for the response.

A preliminary revised schedule for technically correct and complete responses to the remaining 2 questions is provided below. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by February 21, 2012.

Question #	Response Date
RAI 289 — 19-328	February 21, 2012
RAI 289 — 19-329	February 21, 2012

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Tuesday, December 13, 2011 4:31 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 14

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, Supplement 9 on March 29, 2011, Supplement 10 on May 6, 2011, Supplement 11 on June 17, 2011, Supplement 12 on October 18, 2011, and Supplement 13 on November 17, 2011 to provide an updated schedule for the response.

A preliminary revised schedule for technically correct and complete responses to the remaining 2 questions is provided below. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by January 25, 2012.

Question #	Response Date
RAI 289 — 19-328	January 25, 2012
RAI 289 — 19-329	January 25, 2012

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WILLIFORD Dennis (RS/NB)
Sent: Thursday, November 17, 2011 6:16 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 13

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, Supplement 9 on March 29, 2011, Supplement 10 on May 6, 2011, Supplement 11 on June 17, 2011, and Supplement 12 on October 18, 2011, to provide an updated schedule for the response.

A preliminary revised schedule for technically correct and complete responses to the remaining 2 questions is provided below. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by December 14, 2011.

Question #	Response Date
RAI 289 — 19-328	December 14, 2011
RAI 289 — 19-329	December 14, 2011

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.

7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262

From: WILLIFORD Dennis (RS/NB)
Sent: Tuesday, October 18, 2011 4:49 PM
To: Getachew.Tesfaye@nrc.gov
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 12

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, Supplement 9 on March 29, 2011, Supplement 10 on May 6, 2011, and Supplement 11 on June 17, 2011, to provide an updated schedule for the response.

A preliminary revised schedule for technically correct and complete responses to the remaining 2 questions is provided below. This schedule is being reevaluated and a new supplement with a revised schedule will be transmitted by November 17, 2011.

Question #	Response Date
RAI 289 — 19-328	November 17, 2011
RAI 289 — 19-329	November 17, 2011

Sincerely,

Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager

AREVA NP Inc.
7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: RYAN Tom (RS/NB)
Sent: Friday, June 17, 2011 10:26 AM
To: 'Tesfaye, Getachew'
Cc: NOXON David (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); WILLIFORD Dennis (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 11

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, Supplement 9 on March 29, 2011, and Supplement 10 on May 6, 2011 provided an updated schedule for the response.

The schedule for RAI 289 Questions 19-328 and 19-329 has been changed and is provided below:

Question #	Response Date
RAI 289 — 19-328	October 19, 2011
RAI 289 — 19-329	October 19, 2011

Sincerely,

**Tom Ryan for
Dennis Williford, P.E.
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.**

7207 IBM Drive, Mail Code CLT 2B
Charlotte, NC 28262
Phone: 704-805-2223
Email: Dennis.Williford@areva.com

From: WELLS Russell (RS/NB)
Sent: Friday, May 06, 2011 10:56 AM
To: Tesfaye, Getachew
Cc: NOXON David (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 10

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, Supplement 8 on February 28, 2011, and Supplement 9 on March 29, 2011, providing an updated schedule for the response.

The schedule for RAI 289 Question 19-328 is being revised to allow more time to interact with the NRC on the response. The schedule for RAI 289 Question 19-329 is being revised to allow more time to complete the PRA update associated with the response. The schedule for technically correct and complete FINAL responses to the remaining 2 questions has been changed and is provided below:

Question #	Response Date
RAI 289 — 19-328	June 17, 2011
RAI 289 — 19-329	June 17, 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: Tuesday, March 29, 2011 4:18 PM

To: 'Tesfaye, Getachew'

Cc: NOXON David (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 9

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010, Supplement 7 on January 25, 2011, and Supplement 8 on February 28, 2011, providing an updated schedule for the response.

The schedule for RAI 289 Questions 19-328 and 19-329 is being revised to allow more time to interact with the NRC on the response. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Response Date
RAI 289 — 19-328	May 6, 2011
RAI 289 — 19-329	May 6, 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, February 28, 2011 7:54 AM

To: 'Tesfaye, Getachew'

Cc: NOXON David (RS/NB); BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, Supplement 6 on October 15, 2010 and Supplement 7 on January 25, 2011 providing an updated schedule for the response.

The schedule for RAI 289 Question 19-328 is being revised to allow more time to interact with the NRC on the response. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Response Date
RAI 289 — 19-328	March 31, 2011
RAI 289 — 19-329	March 31, 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: Tuesday, January 25, 2011 3:09 PM

To: 'Tesfaye, Getachew'

Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); NOXON David (RS/NB)

Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, Supplement 5 on September 22, 2010, and Supplement 6 on October 15, 2010 providing an updated schedule for the response.

The schedule for RAI 289 Question 19-328 is being revised to allow more time to interact with the NRC on the response. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Response Date
RAI 289 — 19-328	February 28, 2011
RAI 289 — 19-329	March 31, 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: Friday, October 15, 2010 4:03 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, Supplement 4 on August 20, 2010, and Supplement 5 on September 22, 2010, providing an updated schedule for the response.

The schedule for RAI 289 Question 19-329 is being revised to allow more time to complete the response. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Response Date
RAI 289 — 19-328	January 27, 2011
RAI 289 — 19-329	March 31, 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: Wednesday, September 22, 2010 2:47 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 5

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, Supplement 3 on July 20, 2010, and Supplement 4 on August 20, 2010, providing an updated schedule for the response.

The schedule for RAI 289 Question 19-328 is being revised to allow more time to interact with the NRC. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Response Date
RAI 289 — 19-328	January 27, 2011
RAI 289 — 19-329	October 15, 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 (External RS/NB)
Sent: Friday, August 20, 2010 12:42 PM
To: 'Tefsaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); NOXON David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, Supplement 2 on June 11, 2010, and Supplement 3 on July 20, 2010 providing an updated schedule for the response. AREVA NP provided a draft response to RAI 289 Question 19-328 on June 11, 2010.

The schedule for RAI 289 Question 19-328 is being revised to allow more time to interact with the NRC on the draft response. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Supplement Date (providing FSAR Markup)
RAI 289 — 19-328	September 23, 2010
RAI 289 — 19-329	October 15, 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: Tuesday, July 20, 2010 4:31 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); NOXON David B (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, and Supplement 2 on June 11, 2010, providing an updated schedule for the response. AREVA NP provided a draft response to RAI 289 Question 19-328 on June 11, 2010.

The schedule for RAI 289 Question 19-328 is being revised to allow more time for NRC review of the draft response. If the response can be sent as final let me know.

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

Question #	Supplement Date (providing FSAR Markup)
RAI 289 — 19-328	August 23, 2010
RAI 289 — 19-329	October 15, 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, June 11, 2010 4:05 PM
To: 'Tefaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); NOXON David B (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010. AREVA NP submitted Supplement 1 to the response on May 24, 2010, providing an updated schedule for the response.

The schedule for RAI 289 Question 19-328 is being revised to allow time to interact with the NRC on the draft response. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Supplement Date (providing FSAR Markup)
RAI 289 — 19-328	July 21, 2010
RAI 289 — 19-329	October 15, 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: Monday, May 24, 2010 4:49 PM
To: 'Tesyfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); NOXON David B (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a schedule for a technically correct and complete response to RAI No. 289 on February 17, 2010.

As agreed with the NRC, the schedule for RAI 289 Question 19-328 is being revised to allow more time to discuss the proposed response with the NRC. A telecon was originally scheduled for May 19, 2010 to discuss the proposed responses, but it had to be rescheduled. The schedule for technically correct and complete responses to the remaining 2 questions has been changed and is provided below:

Question #	Supplement Date (providing FSAR Markup)
RAI 289 — 19-328	June 21, 2010
RAI 289 — 19-329	October 15, 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: DUNCAN Leslie E (AREVA NP INC)
Sent: Wednesday, February 17, 2010 4:47 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); NOXON David B (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 289 Response US EPR DC.pdf," provides the schedule for technically correct and complete responses to these questions.

The following table indicates the respective pages in the response document, "RAI 289 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 289 — 19-328	2	2
RAI 289 — 19-329	3	3

The schedule for technically correct and complete responses to these questions is provided below.

Question #	Response Date
RAI 289 — 19-328	May 24, 2010
RAI 289 — 19-329	October 15, 2010

Sincerely,

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

From: Tesfaye, Getachew [<mailto:Getachew.Tesfaye@nrc.gov>]
Sent: Thursday, September 10, 2009 9:02 AM
To: ZZ-DL-A-USEPR-DL
Cc: Clark, Theresa; Phan, Hanh; Fuller, Edward; Mrowca, Lynn; Chowdhury, Prosanta; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 289 (3500), FSARCh. 19

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on August 28, 2009, and on September 4, 2009, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. The questions in this RAI are considered potential open items for Phases 2 and 3 reviews. As such, the schedule we have established for your application assumes technically correct and complete responses prior to the start of Phase 4 review. For

any RAI question that cannot be answered prior to the start of Phase 4 review, it is expected that a date for receipt of this information will be provided 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: 4518

Mail Envelope Properties (554210743EFE354B8D5741BEB695E65617C141)

Subject: Advanced Response to U.S. EPR Design Certification Application RAI No. 289, FSAR Ch. 19, Question 19-328
Sent Date: 5/30/2013 6:14:33 PM
Received Date: 5/30/2013 6:14:38 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:

"Ford, Tanya" <Tanya.Ford@nrc.gov>
Tracking Status: None
"ANDERSON Katherine (EXTERNAL AREVA)" <katherine.anderson.ext@areva.com>
Tracking Status: None
"DELANO Karen (AREVA)" <Karen.Delano@areva.com>
Tracking Status: None
"HONMA George (EXTERNAL AREVA)" <George.Honma.ext@areva.com>
Tracking Status: None
"LEIGHLITER John (AREVA)" <John.Leighliter@areva.com>
Tracking Status: None
"LEWIS Ray (EXTERNAL AREVA)" <Ray.Lewis.ext@areva.com>
Tracking Status: None
"ROMINE Judy (AREVA)" <Judy.Romine@areva.com>
Tracking Status: None
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"SHEPHERD Tracey (AREVA)" <Tracey.Shepherd@areva.com>
Tracking Status: None
"VANCE Brian (AREVA)" <Brian.Vance@areva.com>
Tracking Status: None
"NOXON David (AREVA)" <David.Noxon@areva.com>
Tracking Status: None
"RITCHEY Calvin (AREVA)" <Calvin.Ritchey@areva.com>
Tracking Status: None
"GUCWA Len (EXTERNAL AREVA)" <Len.Gucwa.ext@areva.com>
Tracking Status: None
"Snyder, Amy" <Amy.Snyder@nrc.gov>
Tracking Status: None

Post Office: FUSLYNCMX03.fdom.ad.corp

Files	Size	Date & Time	
MESSAGE	29330	5/30/2013 6:14:38 PM	
Advanced Response to RAI 289 Question 19-328 US EPR DC.pdf			75666

Options

Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal

Expiration Date:
Recipients Received:

Advanced Response to

Request for Additional Information No. 289, Question 19-328

9/10/2009

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation

Application Section: 19

**QUESTIONS for PRA Licensing, Operations Support and Maintenance Branch 1
(AP1000/EPR Projects) (SPLA)**

Question 19-328:

POTENTIAL OPEN ITEM

(Follow-up to Question 19-257) At the August 6, 2009, public meeting on unresolved issues related to U.S. EPR Final Safety Analysis Report (FSAR) Chapter 19, the staff discussed the probabilistic risk assessment (PRA) assumption that the AV42 priority modules are not subject to common-cause failure (CCF). The instrumentation and controls (I&C) staff has not reached a conclusion on the testability of the AV42 design, which is cited as support for the exclusion of CCF in item 7 of FSAR Table 19.1-108. In addition, this item states that "[s]oftware CCF is not a concern" without addressing CCFs that could result from manufacturing, maintenance, or other errors. The staff observes that, if a CCF occurred, manual and automatic actuation of components in various systems could be affected. Please provide further justification for excluding both software and hardware CCFs of the AV42 modules from the PRA. As needed, please revise the assumptions and insights in FSAR Chapter 19 to reflect potential failure modes of the modules.

Response to Question 19-328:

As described in Reference 1, the AV42 is no longer the priority module in the U.S. EPR system architecture. Priority and actuator control (PACS) is implemented on a per actuator basis. Every actuator has its own set of electronic modules dedicated to PACS functionality. With the revised design, these functions are allocated into two separate modules: a safety related priority module (SPLM-PC11), and a non-safety communication module. Reference 1 also describes the revised architecture for the PACS. CCFs addressed in this response are applicable to the priority module only. The priority module selected for U.S. EPR SPLM-PC11 is a newer version of SPLM-PC10.

The priority module hardware design is implemented on a printed circuit board comprised of two subsystems (A and B) with identical hardware. Logic functions for priority and monitoring are distributed among subsystems A and B. Each subsystem is based on a programmable logic device (PLD) fitted to fulfill the assigned tasks. For a more detailed description of the priority model, refer to AREVA Technical Report ANP-10310P (Reference 2)..

U.S. EPR PRA CCF evaluations are based on the methodology presented in NUREG/CR-5485 (Reference 3). NUREG/CR-5485 describes the identification of failure causes and coupling mechanisms, which are further defined in NUREG/CR-6268 (Reference 4).

Failure causes associated with the priority modules can be broken down into software- and hardware-related causes. For software CCF, DI&C-ISG-04 and BTP 7-19 provide methods for testing to eliminate the consideration of CCF. AREVA Technical Report ANP-10310P outlines the methodology of 100 percent combinatory testing to preclude PLD-based priority module from software CCF.

Reference 2 explains the test methodology based on a practical example, using the SPLM1-PC10 priority control module which is implemented as a dedicated instance of the SPLM1 programmable logic module of the TELEPERM XS (TXS) equipment platform.

The example provided in this technical report describes the required functions of the test machine and the overall test process. The creation of the test vectors is based on a

spreadsheet implementation of the PC-10's logic. The report includes descriptions of outputs from the existing test machine. The test results critical to safety functions will be manually verified, because the test is implemented through an automatic test generator.

Successful completion of the 100 percent combinatory testing described above demonstrates that zero error has been introduced by the design tool in the software implementation phase and that software-related CCF are not credible.

Hardware-related CCF are evaluated based on the five basic coupling mechanisms identified in NUREG/CR-6268:

- Quality.
- Design.
- Maintenance.
- Operations.
- Environment.

For the priority modules, each of these coupling mechanisms is discussed in terms of the defenses that exist to prevent or mitigate any associated CCF.

Quality and Design

In terms of quality and design, the priority module lifecycle is subject to the TXS platform quality assurance standards and the TXS platform design process described in EMF-2110(NP)(A) (Reference 5). This process includes independent third party reviews, in order to show an important part of the design verification and validation process.

Priority module hardware design is manifested by a hardware qualification program, including analytical assessment of conservative design (critical load analysis). It is verified by assessing the operating experience of SPLM-module and modules of similar design. SPLM1, the first member of this family, has an accumulated operating time for 460 installed modules of approximately 1230 years, with only one failure (data as of September 2012). Many other applications using this module are currently in the design or integration test field and will have significant operating time before the U.S. EPR begins operation.

Software design is verified through life cycle, external assessment and 100 percent proof of design testing.

Maintenance

Maintenance-related common cause coupling factors are eliminated because the priority module does not require post-installation service or maintenance. The functions on the priority module are implemented in solid state logic gate arrays and are non-user programmable.

Operations

Defenses against operations-related CCF include the following:

- Safety-related operator commands to the priority module are administered through the safety automation system and the protection system before being processed in the module logic.
- Priority modules execute priority based on unchangeable programmed logic.
- Local testing at the control panel does not alter the functionality of the module.

Environment

For defense against environment-related CCF, the equipment used in the PACS is qualified environmentally, seismically, and for electromagnetic interference (EMI) and radio frequency interference (RFI) conditions in accordance with the environmental qualification program described in U.S. EPR FSAR Tier 2, Section 3.11. The priority modules are installed inside PACS panels in four divisions, with one set of modules dedicated to a single actuator. Each division is located in a corresponding Safeguard Building (SB). The SBs are physically separated around the primary containment. Environmental conditions are controlled separately in each SB. PACS panels will remain in a mild environment during design basis events. The design provides for independence between the four divisions of the PACS, and between the PACS and interfacing non-safety systems. The characteristics of this independence are physical separation, electrical isolation, and communications independence, as described in U.S. EPR FSAR Tier 2, Section 7.1.

Conclusions and PRA Sensitivity

In conclusion, the priority modules are not susceptible to CCF. PACS 100 percent combinatorial testing demonstrates that the priority modules in PACS are not subject to software-related CCF. Additionally, the priority modules are not susceptible to hardware-related CCF because of the following:

- The priority modules are subject to the TXS platform quality assurance standards and the TXS platform design process.
- The functions on the priority module are implemented in solid state logic gate arrays, are non-user programmable, and require no post-installation service or maintenance.
- The priority modules reside in a mild environment during design basis events, and are qualified for environmental, seismic, and EMI/RFI conditions.
- The priority modules have physical separation and independence between redundant trains.

To quantify the uncertainty associated with this assumption, a sensitivity analysis has been performed to assess the impact of including priority module CCF. CCF groups are created for all priority modules associated with redundant trains of the same system and function. The beta factor CCF methodology was used, and a beta factor of 0.005 was assigned. The impact on core damage frequency (CDF) is assessed (all operating modes and internal hazards). This sensitivity case results in a six percent (6%) increase in total CDF.

U.S. EPR FSAR Tier 2, Table 19.1-108, Item 7 was revised previously, in Revision 2 of the U.S. EPR FSAR, to remove references to the AV42 module and to reflect the conclusions of this response.

References

1. ANP-10309P, Revision 5, "U.S. EPR Protection System Technical Report," AREVA NP Inc, May 2013.
2. ANP-10310P, Revision 2, "Methodology for 100% Combinatorial Testing of the U.S. EPR Priority Module Technical Report," AREVA NP Inc, May 2013.
3. NUREG/CR-5485, "Common-Cause Failures in Probabilistic Risk Assessment," U.S. Nuclear regulatory Commission, November 1998.
4. NUREG/CR-6268, "Common-Cause Failure Database and Analysis System: Event Data Collection, Classification, and Coding," U.S. Nuclear regulatory Commission, September 2007.
5. EMF-2110(NP)(A), Revision 1, "TELEPERM XS: A Digital Reactor Protection System," Siemens Power Corporation, July 2000.

FSAR Impact:

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