ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Friday, May 20, 2011 1:10 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); KOWALSKI David (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 18
Attachments: RAI 385 Supplement 18 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11, Supplement 12, Supplement 13, Supplement 14 and Supplement 15 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010, December 15, 2010, January 6, 2011, January 12, 2011, February 9, 2011, March 2, 2011 and April 5, 2011, respectively, to provide a revised schedule. Supplement 16 response to RAI No. 385 was sent on April 18, 2011 to provide technically correct and complete responses to three of the seven questions. Supplement 17 response to RAI No. 385 was sent on May 6, 2011 to provide a revised schedule.

The attached file, "RAI 385 Supplement 18 Response US EPR DC.pdf" provides a technically correct and complete final response to Question 09.01.05-22.

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 385 Question 09.01.05-22.

The following table indicates the respective pages in the response document, "RAI 385 Supplement 18 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 385 — 09.01.05-22	2	3

The schedule for technically correct and complete responses to the remaining three questions has not changed and is provided below:

Question #	Response Date
RAI 385 — 09.01.04-15	June 10, 2011
RAI 385 — 09.01.04-16	June 10, 2011
RAI 385 — 09.01.04-17	June 10, 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: WELLS Russell (RS/NB)
Sent: Friday, May 06, 2011 10:18 AM
To: Tesfaye, Getachew
Cc: KOWALSKI 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. 385, FSAR Ch. 9, Supplement 17

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11, Supplement 12, Supplement 13, Supplement 14 and Supplement 15 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010, December 15, 2010, January 6, 2011, January 12, 2011, February 9, 2011, March 2, 2011 and April 5, 2011, respectively, to provide a revised schedule. Supplement 16 response to RAI No. 385 was sent on April 18, 2011 to provide technically correct and complete responses to three of the seven questions.

To provide additional time to interact with the NRC on Questions 09.01.04-15, 09.01.04-16 and 09.01.04-17, a revised schedule is provided in this e-mail.

A final response to Question 09.01.05-22 is being prepared to incorporate NRC review comments on the revised draft response; a revised schedule is provided in this e-mail.

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

Question #	Response Date
RAI 385 — 09.01.04-15	June 10, 2011
RAI 385 — 09.01.04-16	June 10, 2011
RAI 385 — 09.01.04-17	June 10, 2011
RAI 385 — 09.01.05-22	May 20, 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, April 18, 2011 4:36 PM

To: 'Tesfaye, Getachew'
Cc: KOWALSKI 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. 385, FSAR Ch. 9, Supplement 16

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11, Supplement 12, Supplement 13, Supplement 14 and Supplement 15 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010, December 15, 2010, January 6, 2011, January 12, 2011, February 9, 2011, March 2, 2011 and April 5, 2011, respectively, to provide a revised schedule.

The attached file, "RAI 385 Supplement 16 Response US EPR DC.pdf" provides technically correct and complete responses to three of the seven questions.

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 385 Questions 09.01.05-20 and 09.01.05-21.

The following table indicates the respective pages in the response document, "RAI 385 Supplement 16 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 385 — 09.01.05-20	2	2
RAI 385 — 09.01.05-21	3	4
RAI 385 — 09.01.05-23	5	6

The schedule for technically correct and complete responses to the remaining four questions has not changed and is provided below:

Question #	Response Date
RAI 385 — 09.01.04-15	May 6, 2011
RAI 385 — 09.01.04-16	May 6, 2011
RAI 385 — 09.01.04-17	May 6, 2011
RAI 385 — 09.01.05-22	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: Tuesday, April 05, 2011 8:27 AM
To: 'Tesfaye, Getachew'
Cc: KOWALSKI 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. 385, FSAR Ch. 9, Supplement 15

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11, Supplement 12, Supplement 13 and Supplement 14 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010, December 15, 2010, January 6, 2011, January 12, 2011, February 9, 2011 and March 2, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail.

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

Question #	Response Date
RAI 385 — 09.01.04-15	May 6, 2011
RAI 385 — 09.01.04-16	May 6, 2011
RAI 385 — 09.01.04-17	May 6, 2011
RAI 385 — 09.01.05-20	May 6, 2011
RAI 385 — 09.01.05-21	May 6, 2011
RAI 385 — 09.01.05-22	May 6, 2011
RAI 385 — 09.01.05-23	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: Wednesday, March 02, 2011 10:22 AM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); ROMINE Judy (RS/NB); DELANO Karen (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 14

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11, Supplement 12 and Supplement 13 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010, December 15, 2010, January 6, 2011, January 12, 2011 and February 9, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail.

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

Question #	Response Date
RAI 385 — 09.01.04-15	April 7, 2011
RAI 385 — 09.01.04-16	April 7, 2011
RAI 385 — 09.01.04-17	April 7, 2011
RAI 385 — 09.01.05-20	April 7, 2011
RAI 385 — 09.01.05-21	April 7, 2011
RAI 385 — 09.01.05-22	April 7, 2011
RAI 385 — 09.01.05-23	April 7, 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, February 09, 2011 2:52 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 13

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10, Supplement 11 and Supplement 12 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010, December 15, 2010, January 6, 2011, and January 12, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	March 9, 2011
RAI 385 — 09.01.04-16	March 9, 2011
RAI 385 — 09.01.04-17	March 9, 2011
RAI 385 — 09.01.05-20	March 9, 2011
RAI 385 — 09.01.05-21	March 9, 2011
RAI 385 — 09.01.05-22	March 9, 2011
RAI 385 — 09.01.05-23	March 9, 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, January 12, 2011 6:35 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 12

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9, Supplement 10 and Supplement 11 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010, December 15, 2010 and January 6, 2011, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the responses to Questions 09.01.05-20 and 09.01.05-22.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	February 10, 2011
RAI 385 — 09.01.04-16	February 10, 2011
RAI 385 — 09.01.04-17	February 10, 2011
RAI 385 — 09.01.05-20	February 10, 2011
RAI 385 — 09.01.05-21	February 10, 2011
RAI 385 — 09.01.05-22	February 10, 2011
RAI 385 — 09.01.05-23	February 10, 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: Thursday, January 06, 2011 8:14 AM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 11

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8, Supplement 9 and Supplement 10 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010, November 23, 2010 and December 15, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the responses to Questions 09.01.04-15, 09.01.04-16, 09.01.04-17, 09.01.05-21 and 09.01.05-23.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	February 10, 2011
RAI 385 — 09.01.04-16	February 10, 2011
RAI 385 — 09.01.04-17	February 10, 2011
RAI 385 — 09.01.05-20	January 14, 2011
RAI 385 — 09.01.05-21	February 10, 2011
RAI 385 — 09.01.05-22	January 14, 2011
RAI 385 — 09.01.05-23	February 10, 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, December 15, 2010 9:44 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB); Miernicki, Michael
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 10

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7, Supplement 8 and Supplement 9 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010, November 18, 2010 and November 23, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the responses to Questions 09.01.05-20 and 09.01.05-22.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	January 6, 2011
RAI 385 — 09.01.04-16	January 6, 2011
RAI 385 — 09.01.04-17	January 6, 2011
RAI 385 — 09.01.05-20	January 14, 2011
RAI 385 — 09.01.05-21	January 6, 2011
RAI 385 — 09.01.05-22	January 14, 2011
RAI 385 — 09.01.05-23	January 6, 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 23, 2010 9:22 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 9

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6, Supplement 7 and Supplement 8 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010, October 28, 2010 and November 18, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the responses to Questions 09.01.04-15 thru -17, 09.01.05-21 and 09.01.05-23.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	January 6, 2011
RAI 385 — 09.01.04-16	January 6, 2011
RAI 385 — 09.01.04-17	January 6, 2011
RAI 385 — 09.01.05-20	December 16, 2010
RAI 385 — 09.01.05-21	January 6, 2011
RAI 385 — 09.01.05-22	December 16, 2010
RAI 385 — 09.01.05-23	January 6, 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: Thursday, November 18, 2010 3:11 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB); 'Miernicki, Michael'
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 8

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, Supplement 6 and Supplement 7 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, October 22, 2010 and October 28, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the responses to Questions 09.01.05-20 and 09.01.05-22.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	November 23, 2010
RAI 385 — 09.01.04-16	November 23, 2010
RAI 385 — 09.01.04-17	November 23, 2010
RAI 385 — 09.01.05-20	December 16, 2010
RAI 385 — 09.01.05-21	November 23, 2010

RAI 385 — 09.01.05-22	December 16, 2010
RAI 385 — 09.01.05-23	November 23, 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: Thursday, October 28, 2010 3:55 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 7

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4, Supplement 5, and Supplement 6 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010, September 22, 2010, and October 22, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, and to provide time to process the responses, a revised schedule is provided in this e-mail for the responses to Questions 09.01.04-15, 09.01.04-16, 09.01.04-17, 09.01.05-21 and 09.01.05-23. The schedule for the responses to the remaining questions is unchanged and is provided below.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	November 23, 2010
RAI 385 — 09.01.04-16	November 23, 2010
RAI 385 — 09.01.04-17	November 23, 2010
RAI 385 — 09.01.05-20	November 18, 2010
RAI 385 — 09.01.05-21	November 23, 2010
RAI 385 — 09.01.05-22	November 18, 2010
RAI 385 — 09.01.05-23	November 23, 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, October 22, 2010 2:06 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 6

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3, Supplement 4 and Supplement 5 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010, September 15, 2010 and September 22, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the responses to Questions 09.01.05-20 and 09.01.05-22.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	October 28, 2010
RAI 385 — 09.01.04-16	October 28, 2010
RAI 385 — 09.01.04-17	October 28, 2010
RAI 385 — 09.01.05-20	November 18, 2010
RAI 385 — 09.01.05-21	October 28, 2010
RAI 385 — 09.01.05-22	November 18, 2010
RAI 385 — 09.01.05-23	October 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 (External RS/NB)
Sent: Wednesday, September 22, 2010 11:46 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 5

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2, Supplement 3 and Supplement 4 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010, August 24, 2010 and September 15, 2010, respectively, to provide a revised schedule.

To provide additional time to interact with the NRC, a revised schedule is provided in this e-mail for the responses to Questions 09.01.05-20 and 09.01.05-22.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	October 28, 2010
RAI 385 — 09.01.04-16	October 28, 2010
RAI 385 — 09.01.04-17	October 28, 2010
RAI 385 — 09.01.05-20	October 22, 2010
RAI 385 — 09.01.05-21	October 28, 2010
RAI 385 — 09.01.05-22	October 22, 2010
RAI 385 — 09.01.05-23	October 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 (External RS/NB)
Sent: Wednesday, September 15, 2010 4:06 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 4

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1, Supplement 2 and Supplement 3 responses to RAI No. 385 were sent on June 24, 2010, July 28, 2010 and August 24, 2010, respectively, to provide a revised schedule.

Since the remaining responses are being processed, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	October 28, 2010
RAI 385 — 09.01.04-16	October 28, 2010
RAI 385 — 09.01.04-17	October 28, 2010
RAI 385 — 09.01.05-20	September 22, 2010
RAI 385 — 09.01.05-21	October 28, 2010
RAI 385 — 09.01.05-22	September 22, 2010
RAI 385 — 09.01.05-23	October 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 (External RS/NB)
Sent: Tuesday, August 24, 2010 9:49 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); KOWALSKI David (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 3

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1 and Supplement 2 responses to RAI No. 385 were sent on June 24, 2010 and July 28, 2010, respectively, to provide a revised schedule.

On July 28, 2010, DRAFT responses to Questions 09.01.05-20 and 09.01.05-22 were submitted to the NRC staff. To allow additional time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	September 15, 2010
RAI 385 — 09.01.04-16	September 15, 2010
RAI 385 — 09.01.04-17	September 15, 2010
RAI 385 — 09.01.05-20	**September 22, 2010**
RAI 385 — 09.01.05-21	September 15, 2010
RAI 385 — 09.01.05-22	**September 22, 2010**
RAI 385 — 09.01.05-23	September 15, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
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Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Wednesday, July 28, 2010 6:14 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 2

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010. Supplement 1 response to RAI No. 385 was sent on June 24, 2010 to provide a revised schedule.

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail.

The schedule for technically correct and complete responses to the questions has been revised and is provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	September 15, 2010
RAI 385 — 09.01.04-16	September 15, 2010
RAI 385 — 09.01.04-17	September 15, 2010
RAI 385 — 09.01.05-20	August 25, 2010
RAI 385 — 09.01.05-21	September 15, 2010
RAI 385 — 09.01.05-22	August 25, 2010
RAI 385 — 09.01.05-23	September 15, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
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Martin.Bryan.ext@areva.com

From: BRYAN Martin (EXT)
Sent: Thursday, June 24, 2010 4:52 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 1

Getachew,

AREVA NP Inc. provided a schedule for technically correct and complete responses to the seven questions in RAI No. 385 on May 19, 2010.

To allow time for interaction between AREVA and the NRC staff, a revised schedule is provided in this e-mail. With respect to Questions 09.01.04-15, 09.01.04-16, 09.01.04-17, and 09.01.04-22, AREVA anticipates having draft responses available during July to support interaction with the NRC staff to review the responses prior to the formal submittal.

The schedule for technically correct and complete responses to the questions identified above has been revised as provided below.

Question #	Response Date
RAI 385 — 09.01.04-15	August 13, 2010
RAI 385 — 09.01.04-16	August 13, 2010

RAI 385 — 09.01.04-17	August 13, 2010
RAI 385 — 09.01.05-20	July 28, 2010
RAI 385 — 09.01.05-21	July 28, 2010
RAI 385 — 09.01.05-22	August 12, 2010
RAI 385 — 09.01.05-23	July 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: Wednesday, May 19, 2010 5:57 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 385 Response US EPR DC," provides a schedule since technically correct and complete responses to the seven questions are not provided. With respect to Questions 09.01.04-15, 09.01.04-16 and 09.01.04-17, AREVA anticipates having draft responses in late July to support interaction with the NRC staff to review the responses prior to the formal submittal. Additional time is included in the response date below to allow for these interactions.

The following table indicates the respective pages in the response document, "RAI 385 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 385 — 09.01.04-15	2	3
RAI 385 — 09.01.04-16	4	5
RAI 385 — 09.01.04-17	6	6
RAI 385 — 09.01.05-20	7	7
RAI 385 — 09.01.05-21	8	8
RAI 385 — 09.01.05-22	9	10
RAI 385 — 09.01.05-23	11	11

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

Question #	Response Date
RAI 385 — 09.01.04-15	August 13, 2010
RAI 385 — 09.01.04-16	August 13, 2010
RAI 385 — 09.01.04-17	August 13, 2010
RAI 385 — 09.01.05-20	June 18, 2010
RAI 385 — 09.01.05-21	June 18, 2010

RAI 385 — 09.01.05-22	July 14, 2010
RAI 385 — 09.01.05-23	June 18, 2010

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
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Tel: (434) 832-3016
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Martin.Bryan.ext@areva.com

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Monday, April 19, 2010 9:46 AM
To: ZZ-DL-A-USEPR-DL
Cc: Curran, Gordon; Lee, Samuel; Segala, John; Hearn, Peter; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 385 (4524, 4515),FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on March 31, 2010, and on April 15, 2010, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 3007

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D4727804)

Subject: Response to U.S. EPR Design Certification Application RAI No. 385, FSAR Ch. 9, Supplement 18
Sent Date: 5/20/2011 1:09:57 PM
Received Date: 5/20/2011 1:11:09 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:
"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
"RYAN Tom (AREVA)" <Tom.Ryan@areva.com>
Tracking Status: None
"KOWALSKI David (AREVA)" <David.Kowalski@areva.com>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: auscharmx02.adom.ad.corp

Files	Size	Date & Time
MESSAGE	35659	5/20/2011 1:11:09 PM
RAI 385 Supplement 18 Response US EPR DC.pdf	127977	

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

Response to

Request for Additional Information No. 385(4524, 4515), Supplement 18

4/19/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.01.04 - Light Load Handling System (Related to Refueling)
SRP Section: 09.01.05 - Overhead Heavy Load Handling Systems

Application Section: 9.1

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

Question 09.01.05-22:

Follow-up to RAI 173, Question 09.01.05-18

The applicant replied to RAI 9.1.5-18 in their response to RAI #173, Supplement 2. The applicant proposed to revise FSAR Tier 2, Table 3.2.2-1 to identify the reactor building (RB) polar crane and fuel building (FB) auxiliary crane as ASME NOG-1 "single-failure-proof" lifting systems meeting the guidance provided in NUREG-0554. The applicant also proposed to review FSAR Tier 1, Section 2.10.1 to add an ITAAC for the "single-failure-proof" RB polar crane and FB auxiliary crane. The following design commitments were proposed to be added to FSAR Tier 1, Section 2.10.1:

3.2. The containment polar crane main hoist is equipped with a dual load path reeving system and redundant holding brakes.

3.3. The auxiliary crane is equipped with a dual load path reeving system and redundant holding brakes.

The staff considers an ITAAC to verify only dual reeving and redundant brakes an insufficient confirmation for a single failure proof design. As a minimum, a single failure proof crane needs to withstand a single failure of any component in the hoist load path from the hoist motor mount to the hook, with the exception that the drum shell and certain hooks have sufficient design margin that their failure is not postulated. In addition to redundancy in some components, protection against some component failures may require instrumentation to detect the failure (i.e., overspeed or drive train continuity monitors) and set the holding brakes. Also, the non-redundant structural components (e.g., bridge structure, trolley structure, and drum shell) should be designed with substantial design margin. Finally, protection against two-blocking and load hang-up, which can be provided by either instrumentation or overload protection devices, is necessary for a single-failure-proof crane per NUREG-0554.

For the single failure proof cranes, the ITAAC should be used to verify certain key attributes of the single failure proof crane using acceptance criteria from the licensing standard (i.e., NUREG-0554 or ASME NOG-1).

As a minimum the ITAAC should address a set of tests that include:

a. Non-destructive evaluation (NDE) of critical welds in the crane structure (Paragraph 4251.4 of ASME NOG-1 or Article 2.6 of NUREG-0554) with acceptance criteria from American Welding Society (AWS) D1.1;

b. Static and dynamic load testing (Paragraph 7422 of ASME NOG-1 or Articles 8.2 and 8.4 of NUREG-0554) with acceptance criteria related to bridge design deflection under load, ability to manually lower load, ability of holding brakes to individually stop and hold rated load, and proper operation of limiting and safety devices; and

c. No-load test of two-blocking protection (either independent tests of redundant upper limit switches or test of energy absorbing device) (Paragraph 7421 of ASME NOG-1 or Article 8.3 of NUREG-0554).

In addition to ITAAC for the crane, there should be ITAAC for critical special lifting devices, which could be limited to the acceptance test in American National Standards Institute/American

Nuclear Society (ANSI/ANS) 14.6 (150% load test for 10 minutes followed by NDE of critical welds per Article 5.5).

In addition to single failure criteria above, the applicant also replied that as described in U.S. EPR FSAR Tier 2, Section 14.3, safety-significant design features are included in U.S. EPR FSAR Tier 1 based on SRP Section 14.3 guidance. SRP Section 14.3 does not identify Seismic Category II as criteria for safety-significant design features. The applicant stated that since Seismic Category II is not criteria for ITAAC, the Seismic Category II entries in FSAR Tier 1, Table 2.10.1-1 are to be changed to "N/A". Similar entries in FSAR Tier 1, Table 2.2.8-1 (Fuel Handling System) are proposed to be changed from Seismic Category II to "N/A" in the response to RAI 201 (RAI 3.2.1-10).

The staff does not agree with deletions and changes from the "Seismic Category II" entries to "N/A" in FSAR Tier 1, Section 2.10.1, Table 2.10.1-1, and Table 2.10.1-2. Even though the response to RAI 201 (RAI 3.2.1-10) generically suggests that there is no ITAAC required for Seismic Category II SSCs, the staff considers the seismic classification of the OHLHS appropriate, based on the safety significance of a dropped load. Therefore, the original FSAR content should not be changed relative to "Seismic Category II" ITAAC. Furthermore, incorporation of the proposed change to Table 2.10.1-1, by revising the seismic classification to "N/A", results in an inconsistency with Tier 2 classification. Therefore, the applicant should:

a. Provide additional justification for removing or changing the seismic classification from Tier 1 and subsequently resolve any inconsistencies.

b. Provide additional criteria to verify cranes are single failure proof in accordance with NUREG-0554 and other applicable codes. Resubmit the proposed ITAAC with a more defined acceptance criteria and details.

Response to Question 09.01.05-22:

U.S. EPR FSAR Tier 1, Section 2.10.1 and Table 2.10.1-2—Cranes ITAAC will be revised to include additional detail with respect to inspections, tests and analyses of single proof cranes and lifting equipment. This will address no load, full load, and rated load tests of the crane hoisting equipment, as well as the key attributes provided to validate a single failure proof crane design. The seismic classification of the cranes will be identified in the ITAAC based on the safety significance of a dropped load, and will be consistent with U.S. EPR FSAR Tier 2, Table 3.2.2-1—Classification Summary. U.S. EPR FSAR Tier 1, Table 2.10.1-1—Crane Equipment Mechanical Design was revised in U.S. EPR FSAR, Revision 2 to reflect a Seismic Category II classification for the containment polar crane and auxiliary crane.

U.S. EPR FSAR Tier 2, Section 9.1.5.1, Section 9.1.5.2.2, Section 9.1.5.2.3, Section 9.1.5.3, Section 9.1.5.4 and Section 9.1.5.6 will be revised to reflect this information.

FSAR Impact:

U.S. EPR FSAR Tier 1, Section 2.10.1 and Table 2.10.1-2, and U.S. EPR FSAR Tier 2, Section 9.1.5.1, Section 9.1.5.2.2, Section 9.1.5.2.3, Section 9.1.5.3, Section 9.1.5.4 and Section 9.1.5.6 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

2.10 Other Systems

2.10.1 Cranes

1.0 Description

The containment polar crane and the auxiliary crane provide for the lifting of heavy loads. The cranes can be operated during shutdown and refueling conditions. Some components of the cranes may be operated during plant operation.

2.0 Arrangement

09.01.05-22

2.1 The component locations of the cranes ~~are~~ is as listed in Table 2.10.1-1—Crane Equipment Mechanical Design.

2.2 The equipment identified in Table 2.10.1-1 is designed to prohibit unacceptable interaction or failure of Seismic Category I SSC.

3.0 Mechanical Design Features

3.1 Deleted.

3.2 The containment polar crane main hoist is equipped with a dual load path reeving system~~,~~ and redundant holding brakes~~, and other key attributes to provide for a single failure proof design~~.

3.3 The auxiliary crane is equipped with a dual load path reeving system~~,~~ and redundant holding brakes~~, and other key attributes to provide for a single failure proof design~~.

4.0 Equipment and System Performance

4.1 Deleted.~~The containment polar crane prevents the uncontrolled lowering of a heavy load.~~

4.2 Deleted.~~The auxiliary crane prevents the uncontrolled lowering of a heavy load.~~

4.3 The containment polar crane main hoist is designed in such a way that a single failure will not result in the loss of the capability of the crane to safely retain the load.

4.4 The auxiliary crane is designed in such a way that a single failure will not result in the loss of the capability of the crane to safely retain the load.

4.5 Special lifting devices and slings used with the auxiliary crane and the main hoist of the polar crane for critical lifts have dual load paths or double safety factors.

4.6 Special lifting devices used with the auxiliary crane and the main hoist of the polar crane for critical lifts are to be load tested followed by non-destructive examination (NDE) of critical welds.

5.0 Inspections, Tests, Analyses and Acceptance Criteria

Table 2.10.1-2 lists the cranes ITAAC.

Table 2.10.1-2—Cranes ITAAC

09.01.05-22

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
2.1	The component location of the cranes ~~are~~ is listed in Table 2.10.1-1.	Inspection of the as-built system will be performed.	The components of the cranes are located as listed in Table 2.10.1-1.
2.2	The equipment identified in Table 2.10.1-1 is designed to prohibit unacceptable interaction or failure of Seismic Category I SSC.	Inspections, tests and analyses of the as-built Seismic Category II equipment will be performed.	A report exists and confirms the equipment's ability to prevent unacceptable interaction with Seismic Category I SSC.
3.1	Deleted.	Deleted.	Deleted.
3.2	The containment polar crane main hoist is equipped with a dual load path reeving system and redundant holding brakes.~~The polar crane system has the following features:~~ ~~•The reeving system has two separate load paths.~~ ~~•Sheaves are contained.~~ ~~•Hoist blocks have upper limit switches.~~ ~~•Hooks either have two attachment points each capable of lifting three times the load or one attachment point capable of lifting six times the load.~~ ~~•Single hoist drive is provided with 2 holding brakes; or dual hoist drives are provided with 1 holding brake for each drive train. Torque setting for brake is 125% of full load torque.~~ ~~• Hoist drum provides load control in event of shaft or bearing failure~~	An inspection of the as-built polar crane load train assembly will be performed.~~a. An inspection of the polar crane system design will be performed.~~ ~~b. Vendor tests and inspections will be performed to verify features credited in the design inspection report:~~ ~~•Test to verify capability of each of two load paths to support the load and maintain vertical alignment.~~ ~~•Inspection of sheaves to verify containment.~~ ~~•Tests to verify operation of upper limit switches.~~ ~~•Test of load capability of the hooks.~~ ~~•Tests to verify operation of the hoist drive brakes.~~ ~~• Test to limit load drop due to hoist drum component failure.~~	The polar crane is equipped with a dual load path from the hook to the hoist brakes with each reeving system capable of holding the load independently.~~a. An inspection report exists and concludes that the design provides the following functions:~~ ~~•Reeving system – two separate load paths are provided such that either path can support the load and maintain vertical alignment in the event of rope breakage.~~ ~~•Hoist blocks and sheaves (upper and lower) – each attachment point supports 3 times the load. Sheaves are contained in event of pin failure. Upper limits switches (separate/independent) for two blocking considerations are provided.~~ ~~•Hooks – 2 attachment points are provided with each designed for 3 times load or 1 attachment point provided designed for 6 times lifted load.~~

Table 2.10.1-2—Cranes ITAAC

09.01.05-22

Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		• Hoist Drives – Single hoist drive is provided with 2 holding brakes; or dual hoist drives are provided with 1 holding brake for each drive train. – Torque setting for brake is 125% of full load torque. • Hoist Drum – Remain on trolley in event of shaft or bearing failure all the while retaining ability to maintain engagement of gearing or brake necessary to retain the load. b. Test and inspection results confirm: • Reeving system – two separate load paths are provided such that either path can support the load and maintain vertical alignment in the event of rope breakage. • Hoist blocks and sheaves (upper and lower) – each attachment point supports 3 times the load. Sheaves are contained in event of pin failure. Upper limits switches (separate/independent) for two blocking considerations are provided. • Hooks – 2 attachment points are provided with each designed for 3 times load or 1 attachment point provided designed for 6 times lifted load. • Hoist Drives – Single hoist

Table 2.10.1-2—Cranes ITAAC

09.01.05-22

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
			~~drive is provided with 2 holding brakes; or dual hoist drives are provided with 1 holding brake for each drive train. Torque setting for brake is 125% of full load torque.~~ • ~~Hoist Drum Remain on trolley in event of shaft or bearing failure and maintain engagement of gearing or brake necessary to retain the load.~~
3.3	The auxiliary crane hoist is equipped with a dual load path reeving system and redundant holding brakes.~~The auxiliary crane system has the following features:~~ ~~•The reeving system has two separate load paths~~ ~~•Sheaves are contained.~~ ~~•Hoist blocks have upper limit switches.~~ ~~•Hooks either have two attachment points each capable of lifting three times the load or one attachment point capable of lifting six times the load.~~ ~~•Single hoist drive is provided with 2 holding brakes; or dual hoist drives are provided with 1 holding brake for each drive train. Torque setting for brake is 125% of full load torque.~~	An inspection of the as-built auxiliary crane load train assembly will be performed.~~a. An inspection of the auxiliary crane system design will be performed.~~ ~~b. Vendor tests and inspections will be performed to verify features credited in the design inspection report:~~ ~~•Test to verify capability of each of two load paths to support the load and maintain vertical alignment.~~ ~~•Inspection of sheaves to verify containment.~~ ~~•Tests to verify operation of upper limit switches.~~ ~~•Test of load capability of the hooks.~~ ~~•Tests to verify operation of the hoist drive brakes.~~ • ~~Test to limit load drop due to hoist drum~~	The auxiliary crane is equipped with a dual load path from the hook to the hoist brakes with each reeving system capable of holding the load independently.~~a. An inspection report exists and concludes that the design provides the following functions:~~ ~~•Reeving system two separate load paths are provided such that either path can support the load and maintain vertical alignment in the event of rope breakage~~ ~~•Hoist blocks and sheaves (upper and lower) each attachment point supports 3 times the load. Sheaves are contained in event of pin failure. Upper limits switches (separate/independent) for two blocking considerations are provided.~~

Table 2.10.1-2—Cranes ITAAC

09.01.05-22

Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
• Hoist drum provides load control in event of shaft or bearing failure	component failure	•Hooks – 2 attachment points are provided with each designed for 3 times load or 1 attachment point provided designed for 6 times lifted load. •Hoist Drives – Single hoist drive is provided with 2 holding brakes; or dual hoist drives are provided with 1 holding brake for each drive train. – Torque setting for brake is 125% of full load torque. •Hoist Drum – Remain on trolley in event of shaft or bearing failure all the while retaining ability to maintain engagement of gearing or brake necessary to retain the load. b. Test and inspection results confirm: •Reeving system – two separate load paths are provided such that either path can support the load and maintain vertical alignment in the event of rope breakage •Hoist blocks and sheaves (upper and lower) – each attachment point supports 3 times the load. Sheaves are contained in event of pin failure. Upper limits switches (separate/independent) for two blocking considerations are provided. •Hooks – 2 attachment

Table 2.10.1-2—Cranes ITAAC

	09.01.05-22 Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
			~~points are provided with each designed for 3 times load or 1 attachment point provided designed for 6 times lifted load.~~ • ~~Hoist Drives — Single hoist drive is provided with 2 holding brakes; or dual hoist drives are provided with 1 holding brake for each drive train. — Torque setting for brake is 125% of full load torque.~~ • ~~Hoist Drum — Remain on trolley in event of shaft or bearing failure and maintain engagement of gearing or brake necessary to retain the load.~~
4.1	Deleted. ~~The containment polar crane prevents the uncontrolled lowering of a heavy load.~~	Deleted. ~~a. "No Load" Test.~~ ~~b. Full Load Test (100% static load test) and Rated Load Test (125% (+5%, -0%) dynamic load test).~~ ~~c. 150% load test of crane special lifting devices.~~	Deleted. ~~a. Correct motor rotation; limit switches (including hoist two blocking protection), interlocks, and stops are adjusted and set.~~ ~~b. Crane lifts the test load, lowers, stops, and holds the load with the hoist holding brakes.~~ ~~c. NDE reveals sound weld metal; no permanent deformation in base metal.~~
4.2	Deleted. ~~The auxiliary crane prevents the uncontrolled lowering of a heavy load.~~	Deleted. ~~a. "No Load" Test.~~ ~~b. Full Load Test (100% static load test) and Rated Load Test (125% (+5%, -0%) dynamic load test).~~ ~~c. 150% load test of crane~~	Deleted. ~~a. Correct motor rotation; limit switches (including hoist two blocking protection), interlocks, and stops are adjusted and set.~~ ~~b. Crane lifts the test load, lowers, stops, and holds the~~

Table 2.10.1-2—Cranes ITAAC

09.01.05-22

	Commitment Wording	Inspections, Tests, Analyses	Acceptance Criteria
		~~special lifting devices.~~	~~load with the hoist holding brakes.~~ ~~c. NDE reveals sound weld metal; no permanent deformation in base metal.~~
4.3	The containment polar crane main hoist is designed in such a way that a single failure will not result in the loss of the capability of the crane to safely retain the load.	Tests, inspections and analyses will be performed on the as-built polar cranes to confirm: a. The receiving system is designed to preclude a load drop in the event of a rope failure. b. Is equipped with two holding brakes. c. Has been rated load tested at a minimum of 125% of the rated load. d. Has been full-load tested at a minimum of 100% rated load. e. Has been no load tested to verify proper operation of limit switches, interlock and stop settings. f. Critical welds have been non-destructively tested.	The following tests, inspections and analyses have been successfully completed for the as-built containment polar crane so that a single failure will not result in the loss of the capability of the crane to safely retain the load: a. A report exists and confirms that the receiving system is designed to preclude a load drop in the event of a rope failure. b. Containment polar crane is equipped with two holding brakes. c. Containment polar crane has passed rated load testing at a minimum of 125% of the rated load. d. Containment polar crane has passed full-load testing at a minimum of 100% rated load. e. Containment polar crane has passed no load testing to verify proper operation of limit switches, interlock and stop settings. f. Critical welds have passed non-destructive testing.

Table 2.10.1-2—Cranes ITAAC

09.01.05-22

Commitment Wording		Inspections, Tests, Analyses	Acceptance Criteria
4.4	The auxiliary crane is designed in such a way that a single failure will not result in the loss of the capability of the crane to safely retain the load.	Tests, inspections and analyses will be performed on the as-built auxiliary cranes to confirm: a. The receiving system is designed to preclude a load drop in the event of a rope failure. b. Is equipped with two holding brakes. c. Has been rated load tested at a minimum of 125% of the rated load. d. Has been full-load tested at a minimum of 100% rated load. e. Has been no load tested to verify proper operation of limit switches, interlock and stop settings. f. Critical welds have been non-destructively tested.	The following tests, inspections and analyses have been successfully completed for the as-built auxiliary crane so that a single failure will not result in the loss of the capability of the crane to safely retain the load: a. A report exists and confirms that the receiving system is designed to preclude a load drop in the event of a rope failure. b. Auxiliary crane is equipped with two holding brakes. c. Auxiliary crane has passed rated load testing at a minimum of 125% of the rated load. d. Auxiliary crane has passed full-load testing at a minimum of 100% rated load. e. Auxiliary crane has passed no load testing to verify proper operation of limit switches, interlock and stop settings. f. Critical welds have passed non-destructive testing.
4.5	Special lifting devices and slings used with the auxiliary crane and the main hoist of the polar crane for critical lifts have dual load paths or double safety factors.	Tests, inspections and analyses will be performed on the lifting components.	The as-built special lifting devices and slings have dual load paths or double safety factors.
4.6	Special lifting devices used with the auxiliary crane and the main hoist of the polar crane for critical lifts are to be load tested followed by NDE of critical welds.	Load testing and post test inspection of the as-built special lifting devices will be performed.	A report exists and confirms load testing and NDE of the as-built special lifting devices used for critical lifts.

4. SSC important to safety are not shared with other reactor units (GDC 5).

5. For those items designated as single failure-proof, the design meets the applicable portions of NUREG-0554 (Reference 1) as modified by Generic Letter 83-042 (Reference 2). In addition, all HLHE meets the guidance of NUREG-0612 (Reference 3) as modified by Generic Letter 85-011 (Reference 4).

The safety and seismic classifications of heavy load handling systems are based on the functions they perform and on their location relative to spent fuel, fuel in the core, nuclear materials, or equipment that may be required to achieve safe plant shutdown. Table 3.2.2-1 provides the safety and seismic classifications for the heavy-load handling cranes.

In addition to equipment design (single failure-proof systems and interlocks) other means are used to reduce the consequences of load handling incidents. These include:

- Design of power plant and arrangement of systems to limit movement of heavy loads over or near safety-related or safe shutdown components.
- Minimizing the elevation between the lifted load and the plant structures.
- Establishment of safe load paths over robust power plant structures.
- Analyses of heavy load drops to confirm damage is acceptable.

The equipment that is used to lift heavy loads is designed and fabricated to codes consistent with the seismic category assigned by RG 1.29 and industry standard specifications, as described in Section 3.2.

The cranes for the U.S. EPR are designed in accordance with the requirements of ASME NOG-1 (Reference 5) and ASME NUM-1 (Reference 6). These standards have been developed using guidance provided by Reference 3, Reference 1, ASME B30.2 (Reference 7) and CMAA-70 (Reference 8). Cranes are designated as NOG-1, Type I, II, or III based on their requirements to handle critical loads and their seismic design criteria.

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Single failure proof designs are equipped with reeving systems so that a single rope failure will not result in the loss of the lifted load. Hoisting units are provided with at least two brakes with a torque rating of at least 125 percent of the rated load hoisting torque. Instrumentation and overload protection devices are used to protect against hoist two blocking and load hangup.

Certain structural components of the crane, while not required to be designed as single failure proof items, are provided with robust designs and substantial design margins.

- Continued lowering of the load (other than full down position) upon receipt of a reduced load signal.
- Continued hoisting of the load upon receipt of an increased load signal (load hang-up).
- Continued upward travel of the hoist on a preset limit (two-blocking event).
- Simultaneous horizontal and vertical movement.
- Continued travel of the bridge and trolley beyond established limits.

Physical limits (hard-stops) are also provided on the bridge and trolly end of travel and on the hoist upper limit.

The RB polar crane is supported by a circular runway, which rests on brackets attached to the containment structure. The structure is a rigid assembly. The bridge framework consists of two girders and two end trucks. The two main girders are welded box sections which are attached with end ties and are supported on the crane end trucks. The end trucks consist of structural frames containing wheel assemblies (bogies). The polar crane girders are provided with full-length walkways that allow access to the associated electrical and mechanical components.

The RB polar crane is equipped with trolleys that traverse the length of the bridge. The trolleys provide structural support for the associated hoisting equipment.

The RB polar crane is provided with three electric hoists. The main hoist is supported by a single trolley and has a rated capacity of 320 metric tons. The secondary trolley supports two hoist units, one rated at 35 metric tons and another rated at five metric tons.

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Special lifting devices used with this crane will satisfy the design criteria and testing specified in ANSI N14.6 (Reference 9). If special lifting devices are not used, slings will be selected that satisfy the criteria of ANSI/ASME B30.9 (Reference 10). In addition, slings for use with single-failure-proof handling systems will be constructed of metallic material (chain or wire rope). Special lifting devices and slings will have either dual independent load paths or a single load path with twice the design safety factor.

9.1.5.2.3 Fuel Building Auxiliary Crane

The FB auxiliary crane, located over the spent pool, is designed in accordance with ASME NOG-1 as a single failure-proof crane (Type I). As a Type I crane, the FB auxiliary crane is capable of handling the maximum critical load (i.e., not drop the load) during an SSE. The FB auxiliary crane is designed to Seismic Category II criteria and in conformance with Reference 1, Reference 2, Reference 3 and Reference 4.

The heavy loads the FB auxiliary crane normally handles include:

- Slot gates – 11.2 metric tons (includes lifting beam and lower load block).
- New fuel containers – 5 metric tons.

In addition, the auxiliary crane can be used to handle spent fuel assemblies in the event that the spent fuel mast bridge is not available. When used in this capacity, interlocks are provided to prevent:

- Continued lowering of the load (other than full down position) upon receipt of a reduced load signal.
- Continued hoisting of the load upon receipt of an increased load signal (load hang-up).
- Continued upward travel of the hoist on a preset limit (two-blocking event).
- Simultaneous horizontal and vertical movement.
- Continued travel of the bridge and trolley beyond established limits.

Physical limits (hard-stops) are also provided on the bridge and trolly end of travel and on the hoist upper limit.

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Special lifting devices used with this crane will satisfy the design criteria and testing specified in ANSI N14.6 (“Special Lifting Devices for Shipping Containers Weighing 10000 Pounds (4500 kg) or More”). If special lifting devices are not used, slings will be selected that satisfy the criteria of ASME B30.9 (“Slings”). In addition, slings for use with single-failure-proof handling systems will be constructed of metallic material (chain or wire rope). Special lifting devices and slings will have either dual independent load paths or a single load path with twice the design safety factor.

9.1.5.2.4 Other Overhead Load Handling Systems

Other than the RB polar crane, other major cranes in the RB include four single girder bridge cranes used for servicing heating, ventilation and air conditioning (HVAC) equipment, four jib cranes located within the steam generator cubicles and an assembly crane located near an accumulator tank. These cranes provide lifting capabilities during plant outages.

The Fuel Building contains bridge cranes in the equipment lock area. These cranes are used to move equipment and material from the plant grade elevation up to the equipment hatch level. These cranes are located in areas remote from the spent fuel pool such that movement of loads in the vicinity of the spent fuel pool by these cranes is not possible.

periods. The bridge girders are tied together using a central arch connected at the midspan of each girder. This arch allows attachment of a hoisting winch which can be used to lift temporary lifting devices onto the crane girders for use in component installation and replacement. The crane is also provided with an A-frame maintenance gantry, rated at 15 metric tons, which allows maintenance activities to be performed on the main and auxiliary/secondary hoists and trolleys.

9.1.5.3 Safety Evaluation

Movement of heavy loads is restricted by design (including interlocks) and/or administrative controls to areas away from stored fuel and equipment necessary for the safe shutdown of the reactor. HLHE located in safety-related areas of the plant include those in the RB, FB, Safeguard Buildings, and Emergency Power Generating Buildings. These buildings are designed to withstand the effects of earthquakes, tornadoes, hurricanes, floods, external missiles, and other similar natural phenomena. Section 3.3, Section 3.4, Section 3.5, Section 3.7, and Section 3.8 provide the bases for the adequacy of the structural design of these buildings.

HLHE is categorized, based on its design, to remain intact after an SSE. For this application, the cranes handling critical loads are designed as Type 1 equipment. A Type 1 crane is one that is required to remain in place and support the critical load during and after the seismic event, but does not have to be operational after this event.

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Single failure-proof features are included so that any credible failure of a single component anywhere along the hoist load path will not result in the loss of potential to stop and hold the critical load. A critical load is defined as a heavy load being lifted over in-service safety-related or safe-shutdown equipment, or fuel, and in a path that if dropped, would affect unit safety or offsite release of radioactivity in excess of established limits. Items designed to meet this function requirement include mechanical and structural items in the load train (i.e., the hook, wire rope, lower and upper block, load brakes, gear train, hoist drum and supports, trolley frame and bridge girders). Section 3.8 provides the design loading conditions that were considered. Section 3.6, Section 3.8, and Appendix 9A provide the results of the required hazards analyses.

Details regarding the specific assumptions, sequences, and analyses of fuel handling or cask drop accidents are provided in Section 15.0.3.10.

Heavy load handling systems provide for the safe handling of loads by either designing them as single failure-proof systems or by making use of the plant equipment and system arrangements so that a load drop will be acceptable. The consequences of a postulated critical load drop are considered to be acceptable when the four evaluation criteria of Paragraph 5.1 of Reference 3 are satisfied. A heavy load that is lifted in a safety-related area is classified as a critical load unless the consequences of a load drop have been evaluated and found to be within acceptable limits.

For heavy loads to be handled by equipment not designated as single failure-proof, additional measures are implemented to make sure the load handling restrictions delineated in Reference 3 and associated load handling regulations are followed. These include limits on lift height of the heavy load (i.e., lifting the load no higher than necessary to reduce potential impact energy), restricting load handling activities to designated safe load paths which are clearly identified on plant structures and administratively controlled, and in certain circumstances evaluating plant SSC for potential load drops.

9.1.5.4 Inspection and Testing Requirements

The preoperational inspection and testing of the HLHE is in accordance with Reference 5. The tests include operational testing with a no-load test of the crane to demonstrate function and speed controls for bridge, trolley, and hoist drives and proper functioning of limit switches (over travel and two blocking), locking, and safety devices. Additionally a full-load test of the crane loaded at 100 percent of the crane manufacturers rating is performed, along with a rated-load test performed at 125 percent of the manufacturers rated load. Refer to Section 14.2 (test abstracts #040 and #041) for the initial plant startup test program.

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Non-destructive examination of critical crane structural welds is performed in accordance with ASME NOG-1 (Reference 5) and meets the acceptance criteria specified in AWS D1.1 (Reference 11).

The inservice inspection of the HLHE is governed by site-specific procedures in accordance with Reference 7. Inservice inspection and testing of special lifting devices used in safety-related areas of the plant meet the criteria specified in ANSI N14.6 (Reference 9). Slings used in safety-related areas meet the criteria specified in ANSI/ ASME B30.9 (Reference 10).

9.1.5.5 Instrumentation Requirements

Included in the crane design are devices which provide additional measures for safe operation of the crane. These devices provide protection for overtravel, overspeed, overload, unbalanced load and proper spooling of the hoisting ropes onto the hoist drums.

The hoisting motions are provided with redundant limit switches which prevent overtravel of the hoist hook in hoisting and lowering operations. The primary limit is a control circuit switch which removes power to the hoist motor and sets the brakes. Motion out of this limit is allowed in the safe direction of travel. The secondary system consists of a power circuit-limit, which when activated directly interrupts power to the hoist motor and the brakes, causing the brakes to set. Motion out of this limit is not possible without corrective action.

10. ANSI/ASME B30.9-2003, "Slings," American National Standards Institute/The American Society of Mechanical Engineers, July 2003.

11. AWS D1.1/D1.1M-2002, "Structural Welding Code-Steel," American Welding Society, 2002.

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