ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Thursday, July 14, 2011 10:24 AM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA); Miernicki, Michael
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 27
Attachments: RAI 354 Supplement 27 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23. On April 18, 2011, AREVA NP submitted Supplement 20 to provide a technically correct and complete FINAL response to Question 03.08.05-22. On April 18, 2011, AREVA NP also submitted Supplement 21 to provide a technically correct and complete response to Question 03.08.02-11. On April 28, 2011, in Supplement 22, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on April 28, 2011. On May 4, 2011, AREVA NP submitted a technically correct and complete response to Question 03.08.05-23 in Supplement 23. On May 27, 2011, AREVA NP submitted Supplement 24 to provide revised schedules for Questions 03.06.02-33, -34, -36 through -40. On June 13, AREVA NP submitted Supplement 25 to provide a revised schedule for Question 03.08.02-13. On June 29, 2011, AREVA NP submitted Supplement 26 to provide a revised schedule.

The attached file, "RAI 354 Supplement 27 Response US EPR DC.pdf" provides a technically correct and complete response to Question 03.08.02-13, as committed. Appended to this file are the affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 354 Question 03.08.02-13.

The following table indicates the respective pages in the response document, "RAI 354 Supplement 27 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 354 — 03.08.02-13	2	6

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

Question #	Response Date
RAI 354 - 03.06.02-33	July 28, 2011
RAI 354 - 03.06.02-34	July 28, 2011
RAI 354 - 03.06.02-35	July 28, 2011
RAI 354 - 03.06.02-36	July 28, 2011
RAI 354 - 03.06.02-37	July 28, 2011
RAI 354 - 03.06.02-38	July 28, 2011
RAI 354 - 03.06.02-39	July 28, 2011
RAI 354 - 03.06.02-40	July 28, 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: WILLIFORD Dennis (RS/NB)
Sent: Wednesday, June 29, 2011 2:32 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 26

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses

to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23. On April 18, 2011, AREVA NP submitted Supplement 20 to provide a technically correct and complete FINAL response to Question 03.08.05-22. On April 18, 2011, AREVA NP also submitted Supplement 21 to provide a technically correct and complete response to Question 03.08.02-11. On April 28, 2011, in Supplement 22, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on April 28, 2011. On May 4, 2011, AREVA NP submitted a technically correct and complete response to Question 03.08.05-23 in Supplement 23. On May 27, 2011, AREVA NP submitted Supplement 24 to provide revised schedules for Questions 03.06.02-33, -34, -36 through -40. On June 13, AREVA NP submitted Supplement 25 to provide a revised schedule for Question 03.08.02-13.

The schedule for the response to Questions 03.06.02-33, -34, -36 through -40 is being revised. The schedule for the remaining questions is unchanged. The schedule for technically correct and complete responses to the remaining questions is provided below.

Question #	Response Date
RAI 354 - 03.08.02-13	July 14, 2011
RAI 354 - 03.06.02-33	**July 28, 2011**
RAI 354 - 03.06.02-34	**July 28, 2011**
RAI 354 - 03.06.02-35	July 28, 2011
RAI 354 - 03.06.02-36	**July 28, 2011**
RAI 354 - 03.06.02-37	**July 28, 2011**
RAI 354 - 03.06.02-38	**July 28, 2011**
RAI 354 - 03.06.02-39	**July 28, 2011**
RAI 354 - 03.06.02-40	**July 28, 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: Monday, June 13, 2011 6:24 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); WELLS Russell (RS/NB); CORNELL Veronica (External RS/NB); WILLIFORD Dennis (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 25

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23. On April 18, 2011, AREVA NP submitted Supplement 20 to provide a technically correct and complete FINAL response to Question 03.08.05-22. On April 18, 2011, AREVA NP also submitted Supplement 21 to provide a technically correct and complete response to question 03.08.02-11. On April 28, 2011, in Supplement 22, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on April 28, 2011. On May 4, 2011, AREVA NP submitted a technically correct and complete response to Question 03.08.05-23 in Supplement 23. On May 27, 2011, AREVA NP submitted Supplement 24 to provide revised schedules for Questions 03.06.02-33, -34, -36 through -40.

The schedule for the response to Question 03.08.02-13 is being revised. The schedule for the remaining questions is unchanged. The schedule for the technically correct and complete responses to the remaining questions is provided below.

Question #	Response Date
RAI 354 - 03.08.02-13	**July 14, 2011**
RAI 354 - 03.06.02-33	June 30, 2011
RAI 354 - 03.06.02-34	June 30, 2011
RAI 354 - 03.06.02-35	July 28, 2011
RAI 354 - 03.06.02-36	June 30, 2011
RAI 354 - 03.06.02-37	June 30, 2011
RAI 354 - 03.06.02-38	June 30, 2011
RAI 354 - 03.06.02-39	June 30, 2011
RAI 354 - 03.06.02-40	June 30, 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: WILLIFORD Dennis (RS/NB)
Sent: Friday, May 27, 2011 10:49 AM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); RYAN Tom (RS/NB); WELLS Russell (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 24

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23. On April 18, 2011, AREVA NP submitted Supplement 20 to provide a technically correct and complete FINAL response to Question 03.08.05-22. On April 18, 2011, AREVA NP also submitted Supplement 21 to provide a technically correct and complete response to question 03.08.02-11. On April 28, 2011, in Supplement 22, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on April 28, 2011. On May 4, 2011, AREVA NP submitted a technically correct and complete response to Question 03.08.05-23.

The schedule for the response to questions 03.06.02-33, -34, -36 through -40 is being revised as noted in bold below. The schedule for the response to questions 03.06.02-35 and 03.08.02-13 is unchanged. The schedule for technically correct and complete responses to the remaining questions is provided below.

Question #	Response Date
RAI 354 - 03.08.02-13	June 14, 2011
RAI 354 - 03.06.02-33	**June 30, 2011**
RAI 354 - 03.06.02-34	**June 30, 2011**
RAI 354 - 03.06.02-35	July 28, 2011
RAI 354 - 03.06.02-36	**June 30, 2011**
RAI 354 - 03.06.02-37	**June 30, 2011**
RAI 354 - 03.06.02-38	**June 30, 2011**
RAI 354 - 03.06.02-39	**June 30, 2011**
RAI 354 - 03.06.02-40	**June 30, 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: Wednesday, May 04, 2011 12:48 PM
To: 'Tesfaye, Getachew'
Cc: CORNELL Veronica (External 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. 354, FSAR Ch. 3, Supplement 23

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-

23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23. On April 18, 2011, AREVA NP submitted Supplement 20 to provide a technically correct and complete FINAL response to Question 03.08.05-22. On April 18, 2011, AREVA NP also submitted Supplement 21 to provide a technically correct and complete response to question 03.08.02-11. On April 28, 2011, in Supplement 22, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on April 28, 2011.

The attached file, "RAI 354 Supplement 23 Response US EPR DC.pdf" provides a technically correct and complete response to Question 03.08.05-23, as committed. Appended to this file are the affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 354 Question 03.08.05-23.

The following table indicates the respective pages in the response document, "RAI 354 Supplement 23 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 354 — 03.08.05-23	2	4

The schedule for the technically correct and complete responses to the remaining questions are unchanged and provided below.

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		June 14, 2011
RAI 354 - 03.06.02-33		May 30, 2011
RAI 354 - 03.06.02-34		May 30, 2011
RAI 354 - 03.06.02-35		July 28, 2011
RAI 354 - 03.06.02-36		May 30, 2011
RAI 354 - 03.06.02-37		May 30, 2011
RAI 354 - 03.06.02-38		May 30, 2011
RAI 354 - 03.06.02-39		May 30, 2011
RAI 354 - 03.06.02-40		May 30, 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: Thursday, April 28, 2011 3:18 PM

To: 'Tesfaye, Getachew'
Cc: CORNELL Veronica (External 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. 354, FSAR Ch. 3, Supplement 22

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23. On April 18, 2011, AREVA NP submitted Supplement 20 to provide a technically correct and complete FINAL response to Question 03.08.05-22. On April 18, 2011, AREVA NP also submitted Supplement 21 to provide a technically correct and complete response to question 03.08.02-11.

The schedule for the response to questions 03.06.02-33 through 03.06.02-40 is being revised to allow AREVA NP additional time to address NRC comments. The schedule for the technically correct and complete responses to the remaining questions is unchanged and provided below.

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		June 14, 2011
RAI 354 - 03.08.05-23		May 10, 2011
RAI 354 - 03.06.02-33		**May 30, 2011**
RAI 354 - 03.06.02-34		**May 30, 2011**
RAI 354 - 03.06.02-35		**July 28, 2011**
RAI 354 - 03.06.02-36		**May 30, 2011**
RAI 354 - 03.06.02-37		**May 30, 2011**
RAI 354 - 03.06.02-38		**May 30, 2011**
RAI 354 - 03.06.02-39		**May 30, 2011**
RAI 354 - 03.06.02-40		**May 30, 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 10:04 AM
To: Tesfaye, Getachew
Cc: CORNELL Veronica (External 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. 354, FSAR Ch. 3, Supplement 21

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23. On April 18, 2011, AREVA NP submitted Supplement 20 to provide a technically correct and complete FINAL response to Question 03.08.05-22.

The attached file, "RAI 354 Supplement 21 Response US EPR DC - PUBLIC.pdf" provides a technically correct and complete response to question 03.08.02-11, as committed. Because the response file contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This email and attached file

do not contain any security-related information. An unredacted security-related version is provided under separate email.

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 354 Question 03.08.02-11.

The following table indicates the respective pages in the response document, "RAI 354 Supplement 21 Response US EPR DC - PUBLIC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 354 — 03.08.02-11	2	5

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		June 14, 2011
RAI 354 - 03.08.05-23		May 10, 2011
RAI 354 - 03.06.02-33		April 29, 2011
RAI 354 - 03.06.02-34		April 29, 2011
RAI 354 - 03.06.02-35		April 29, 2011
RAI 354 - 03.06.02-36		April 29, 2011
RAI 354 - 03.06.02-37		April 29, 2011
RAI 354 - 03.06.02-38		April 29, 2011
RAI 354 - 03.06.02-39		April 29, 2011
RAI 354 - 03.06.02-40		April 29, 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 9:55 AM
To: 'Tesfaye, Getachew'
Cc: CORNELL Veronica (External 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. 354, FSAR Ch. 3, Supplement 20 (Part 3 of 3)

Getachew
Attached is part 3 of 3 for a response of RAI No. 354, FSAR Ch 3, Supplement 20

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 9:54 AM
To: 'Tesfaye, Getachew'
Cc: CORNELL Veronica (External 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. 354, FSAR Ch. 3, Supplement 20 (Part 2 of 3)

Getachew
Attached is part 2 of 3 for a response of RAI No. 354, FSAR Ch 3, Supplement 20

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 9:52 AM
To: 'Tesfaye, Getachew'
Cc: CORNELL Veronica (External 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. 354, FSAR Ch. 3, Supplement 20 (Part 1 of 3)

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5,

2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011. On March 29, 2011, AREVA NP submitted Supplement 19 to provide revised schedules for Question 03.08.05-22 and Question 03.08.05-23.

The attached file, "RAI 354 Supplement 20 Response US EPR DC (1 of 3).pdf" provides a technically correct and complete response to question 03.08.05-22, as committed. Due to file size, the remaining parts will be provided in subsequent e-mails.

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 354 Question 03.08.05-22.

The following table indicates the respective pages in the response document, "RAI 354 Supplement 20 Response US EPR DC (1 of 3).pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 354 — 03.08.05-22	2	9

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		April 28, 2011
RAI 354 - 03.08.02-13		June 14, 2011
RAI 354 - 03.08.05-23		May 10, 2011
RAI 354 - 03.06.02-33		April 29, 2011
RAI 354 - 03.06.02-34		April 29, 2011
RAI 354 - 03.06.02-35		April 29, 2011
RAI 354 - 03.06.02-36		April 29, 2011
RAI 354 - 03.06.02-37		April 29, 2011
RAI 354 - 03.06.02-38		April 29, 2011
RAI 354 - 03.06.02-39		April 29, 2011
RAI 354 - 03.06.02-40		April 29, 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 10:11 AM
To: 'Tesfaye, Getachew'
Cc: CORNELL Veronica (External 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. 354, FSAR Ch. 3, Supplement 19

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13. In Supplement 18, AREVA NP submitted a revised schedule for Questions 03.06.02-33 through 03.06.02-40 on March 17, 2011.

The schedule for Question 03.08.05-22 is being revised to allow AREVA NP additional time to interact with the NRC. In addition, Question 03.08.05-23 is being revised to allow AREVA NP additional time to address NRC audit comments. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		April 28, 2011
RAI 354 - 03.08.02-13		June 14, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual	**May 10, 2011**

Question #	Interim Response Date	Response Date
	September 13, 2010) November 22, 2010 (Actual)	
RAI 354 - 03.08.05-23		**May 10, 2011**
RAI 354 - 03.06.02-33		April 29, 2011
RAI 354 - 03.06.02-34		April 29, 2011
RAI 354 - 03.06.02-35		April 29, 2011
RAI 354 - 03.06.02-36		April 29, 2011
RAI 354 - 03.06.02-37		April 29, 2011
RAI 354 - 03.06.02-38		April 29, 2011
RAI 354 - 03.06.02-39		April 29, 2011
RAI 354 - 03.06.02-40		April 29, 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: Thursday, March 17, 2011 4:46 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 18

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for

Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23. On March 3, 2011, AREVA NP submitted Supplement 17 to provide a technically correct and complete FINAL response to Question 03.08.02-12 and a revised schedule for Questions 03.08.02-11 and Question 03.08.02-13.

The schedule for Questions 03.06.02-33 through 03.06.02-40 has been revised In order to allow time for interaction with the NRC. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		April 28, 2011
RAI 354 - 03.08.02-13		June 14, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) November 22, 2010 (Actual)	March 31, 2011
RAI 354 - 03.08.05-23		March 31, 2011
RAI 354 - 03.06.02-33		**April 29, 2011**
RAI 354 - 03.06.02-34		**April 29, 2011**
RAI 354 - 03.06.02-35		**April 29, 2011**
RAI 354 - 03.06.02-36		**April 29, 2011**
RAI 354 - 03.06.02-37		**April 29, 2011**
RAI 354 - 03.06.02-38		**April 29, 2011**
RAI 354 - 03.06.02-39		**April 29, 2011**
RAI 354 - 03.06.02-40		**April 29, 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: Thursday, March 03, 2011 6:10 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy (RS/NB); DELANO Karen (RS/NB); ROMINE Judy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 17

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to

provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011. On February 11, 2011, AREVA NP submitted Supplement 16 to provide a revised schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, 03.08.05-22 and 03.08.05-23.

The attached file, "RAI 354 Supplement 17 Response US EPR DC.pdf" provides a technically correct and complete FINAL response to the Question 03.08.02-12, as committed.

The following table indicates the page in the response document, "RAI 354 Supplement 17 Response US EPR DC.pdf" that contains AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 354 – 03.08.02-12	2	3

The schedule for Question 03.08.02-11 and Question 03.08.02-13 is being revised to allow AREVA NP additional time to address NRC audit comments. The schedule for the remaining question is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		**April 28, 2011**
RAI 354 - 03.08.02-13		**June 14, 2011**
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) November 22, 2010 (Actual)	March 31, 2011
RAI 354 - 03.08.05-23		March 31, 2011
RAI 354 - 03.06.02-33		March 31, 2011
RAI 354 - 03.06.02-34		March 31, 2011
RAI 354 - 03.06.02-35		March 31, 2011
RAI 354 - 03.06.02-36		March 31, 2011
RAI 354 - 03.06.02-37		March 31, 2011
RAI 354 - 03.06.02-38		March 31, 2011
RAI 354 - 03.06.02-39		March 31, 2011
RAI 354 - 03.06.02-40		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: Friday, February 11, 2011 1:20 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 16

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 14, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011. In Supplement 15, AREVA NP submitted a revised schedule for Question 03.08.05-22 on January 13, 2011.

The schedule for Questions 03.08.02-11, 03.08.02-12, 03.08.02-13, and 03.08.05-22 has changed. The schedule for Question 03.08.05-23 is being revised to allow AREVA NP additional time to address NRC comments. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		March 4, 2011
RAI 354 - 03.08.02-12		March 4, 2011
RAI 354 - 03.08.02-13		March 4, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010)	March 31, 2011

Question #	Interim Response Date	Response Date
	November 22, 2010 (Actual)	
RAI 354 - 03.08.05-23		March 31, 2011
RAI 354 - 03.06.02-33		March 31, 2011
RAI 354 - 03.06.02-34		March 31, 2011
RAI 354 - 03.06.02-35		March 31, 2011
RAI 354 - 03.06.02-36		March 31, 2011
RAI 354 - 03.06.02-37		March 31, 2011
RAI 354 - 03.06.02-38		March 31, 2011
RAI 354 - 03.06.02-39		March 31, 2011
RAI 354 - 03.06.02-40		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: Thursday, January 13, 2011 5:34 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 15

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on January 7, 2011.

The schedule for Question 03.08.05-22 is being revised to allow AREVA NP additional time for to address NRC feedback. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		February 15, 2011
RAI 354 - 03.08.02-12		February 15, 2011
RAI 354 - 03.08.02-13		February 15, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) November 22, 2010	March 17, 2011
RAI 354 - 03.08.05-23		February 15, 2011
RAI 354 - 03.06.02-33		March 31, 2011
RAI 354 - 03.06.02-34		March 31, 2011
RAI 354 - 03.06.02-35		March 31, 2011
RAI 354 - 03.06.02-36		March 31, 2011
RAI 354 - 03.06.02-37		March 31, 2011
RAI 354 - 03.06.02-38		March 31, 2011
RAI 354 - 03.06.02-39		March 31, 2011
RAI 354 - 03.06.02-40		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, January 07, 2011 2:57 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 14

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for

the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23. On November 22, 2010, AREVA NP submitted Supplement 13 to provide an INTERIM response to Question 03.08.05-22 and a new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12.

The schedule for Question 03.08.05-23 is being revised to allow additional time for AREVA NP to interact with the NRC. The schedule for the remaining questions is unchanged. Please note that in Supplement 13 the information for Questions 03.06.02-33 through 40 was inadvertently not included in the table, but it has been now been added back.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		February 15, 2011
RAI 354 - 03.08.02-12		February 15, 2011
RAI 354 - 03.08.02-13		February 15, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) November 22, 2010	January 13, 2011
RAI 354 - 03.08.05-23		February 15, 2011
RAI 354 - 03.06.02-33		March 31, 2011
RAI 354 - 03.06.02-34		March 31, 2011
RAI 354 - 03.06.02-35		March 31, 2011
RAI 354 - 03.06.02-36		March 31, 2011
RAI 354 - 03.06.02-37		March 31, 2011
RAI 354 - 03.06.02-38		March 31, 2011
RAI 354 - 03.06.02-39		March 31, 2011
RAI 354 - 03.06.02-40		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: Monday, November 22, 2010 7:40 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 13

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13. On November 17, 2010, AREVA NP submitted Supplement 12 to provide a revised schedule for Questions 03.06.02-33 through 03.06.02-40 and 03.08.05-23.

The attached file, "RAI 354 Supplement 13 Response US EPR DC-INTERIM.pdf" provides a technically correct and complete INTERIM response to question 03.08.05-22, as committed.

Appended to this file are the affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 354 Supplement 13 question 03.08.05-22.

The following table indicates the respective pages in the response document, "RAI 354 Supplement 13 Response US EPR DC-INTERIM.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 354 — 03.08.05-22	2	11

A new schedule for supplemental responses to Questions 03.08.02-11 and 03.08.02-12 is added. The supplemental responses will address open items identified during the NRC October 28-29, 2010, containment appurtenances audit. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-11		February 15, 2011
RAI 354 - 03.08.02-12		February 15, 2011
RAI 354 - 03.08.02-13		February 15, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) November 22, 2010 (Actual)	January 13, 2011

Sincerely,

Martin (Marty) C. Bryan
U.S. EPR Design Certification Licensing Manager
AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Wednesday, November 17, 2010 11:35 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); WELLS Russell (RS/NB); 'Miernicki, Michael'
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 12

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010 and Supplement 11 on November 1, 2010 to provide a revised schedule for the response to Question 03.08.02-13.

A meeting with NRC regarding Questions 03.06.02-33 through 03.06.02-40 was held on November 1. 2010. As a result of that meeting the schedule for the final response to Questions 03.06.02-33 through 03.06.02-40 is being revised to allow additional time for AREVA NP to address NRC comments. Additionally, AREVA plans to prepare a technical report to be submitted with the final response to reflect the information on jet impingement that has been provided to NRC in the RAI responses and the meeting on November 1. 2010. The schedule for Question 03.08.05-23 is also being revised to allow additional time for AREVA NP to interact with the NRC. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		February 15, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) November 22, 2010	January 13, 2011
RAI 354 - 03.08.05-23		January 7, 2011
RAI 354 - 03.06.02-33		March 31, 2011
RAI 354 - 03.06.02-34		March 31, 2011
RAI 354 - 03.06.02-35		March 31, 2011
RAI 354 - 03.06.02-36		March 31, 2011

Question #	Interim Response Date	Response Date
RAI 354 - 03.06.02-37		March 31, 2011
RAI 354 - 03.06.02-38		March 31, 2011
RAI 354 - 03.06.02-39		March 31, 2011
RAI 354 - 03.06.02-40		March 31, 2011

Sincerely,

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AREVA NP Inc.
Tel: (434) 832-3016
702 561-3528 cell
Martin.Bryan.ext@areva.com

From: BRYAN Martin (External RS/NB)
Sent: Monday, November 01, 2010 5:39 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 11

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010. AREVA NP submitted Supplement 10 on October 7, 2010, to provide a revised schedule for the response to Question 03.08.02-13.

The schedule for Question 03.08.02-13 is being revised to allow additional time for AREVA NP to address NRC comments. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		February 15, 2011
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) November 22, 2010	January 13, 2011
RAI 354 - 03.08.05-23		November 18, 2010
RAI 354 - 03.06.02-33		November 18, 2010

Question #	Interim Response Date	Response Date
RAI 354 - 03.06.02-34		November 18, 2010
RAI 354 - 03.06.02-35		November 18, 2010
RAI 354 - 03.06.02-36		November 18, 2010
RAI 354 - 03.06.02-37		November 18, 2010
RAI 354 - 03.06.02-38		November 18, 2010
RAI 354 - 03.06.02-39		November 18, 2010
RAI 354 - 03.06.02-40		November 18, 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 07, 2010 2:41 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 10

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8. In Supplement 9, AREVA NP submitted a revised schedule for Question 03.08.05-23 on October 1, 2010.

The attached file, “RAI 354 Supplement 10 Response US EPR DC.pdf” provides a technically correct and complete FINAL response to Question 03.08.05-21, as committed. The following table indicates the respective pages in the response document, “RAI 354 Supplement 10 Response US EPR DC.pdf,” that contains AREVA NP’s response to the subject question.

Question #	Start Page	End Page
RAI 354 - 03.08.05-21	2	3

The schedule for a revised INTERIM response to Question 03.08.05-22 is added to provide the NRC additional information on AREVA NP’s settlement approach. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		November 1, 2010
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010) **November 22, 2010**	January 13, 2011
RAI 354 - 03.08.05-23		November 18, 2010
RAI 354 - 03.06.02-33		November 18, 2010
RAI 354 - 03.06.02-34		November 18, 2010
RAI 354 - 03.06.02-35		November 18, 2010
RAI 354 - 03.06.02-36		November 18, 2010
RAI 354 - 03.06.02-37		November 18, 2010
RAI 354 - 03.06.02-38		November 18, 2010
RAI 354 - 03.06.02-39		November 18, 2010
RAI 354 - 03.06.02-40		November 18, 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 01, 2010 2:31 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 9

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21. On September 13, 2010, AREVA NP provided an INTERIM response to Question 03.08.05-22 in Supplement 8.

The schedule for Question 03.08.05-23 is being revised to allow additional time for AREVA NP to interact with the NRC. The schedule for the remaining questions is unchanged.

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		November 1, 2010

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.05-21		October 7, 2010
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010)	January 13, 2011
RAI 354 - 03.08.05-23		November 18, 2010
RAI 354 - 03.06.02-33		November 18, 2010
RAI 354 - 03.06.02-34		November 18, 2010
RAI 354 - 03.06.02-35		November 18, 2010
RAI 354 - 03.06.02-36		November 18, 2010
RAI 354 - 03.06.02-37		November 18, 2010
RAI 354 - 03.06.02-38		November 18, 2010
RAI 354 - 03.06.02-39		November 18, 2010
RAI 354 - 03.06.02-40		November 18, 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: Monday, September 13, 2010 5:09 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010, AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. AREVA NP submitted Supplement 6 on August 31, 2010, to provide final responses to 5 of the remaining 17 questions. On September 8, 2010, AREVA NP submitted Supplement 7 to provide a revised schedule for the response to Question 03.08.05-21.

AREVA NP recently notified the NRC of its intent to submit an INTERIM response to Question 03.08.05-22. The attached file, “RAI 354 Supplement 8 Response US EPR DC-INTERIM.pdf” provides a technically correct and complete INTERIM response to Question 03.08.05-22, as committed. The schedule for the remaining questions is unchanged.

The following table indicates the respective pages in the response document, RAI 354 Supplement 8 Response US EPR DC - INTERIM.pdf,” that contains AREVA NP’s response to the subject question.

Question #	Start Page	End Page

RAI 354 - 03.08.05-22	2	3

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

Question #	Interim Response Date	Response Date
RAI 354 - 03.08.02-13		November 1, 2010
RAI 354 - 03.08.05-21		October 7, 2010
RAI 354 - 03.08.05-22	September 15, 2010 (Actual September 13, 2010)	January 13, 2011
RAI 354 - 03.08.05-23		October 1, 2010
RAI 354 - 03.06.02-33		November 18, 2010
RAI 354 - 03.06.02-34		November 18, 2010
RAI 354 - 03.06.02-35		November 18, 2010
RAI 354 - 03.06.02-36		November 18, 2010
RAI 354 - 03.06.02-37		November 18, 2010
RAI 354 - 03.06.02-38		November 18, 2010
RAI 354 - 03.06.02-39		November 18, 2010
RAI 354 - 03.06.02-40		November 18, 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 08, 2010 6:09 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); 'Miernicki, Michael'; CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010 AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5. On August 31, 2010, AREVA NP submitted final responses to 5 of the remaining 17 questions.

The schedule for Question 03.08.05-21 is being revised to allow additional time for AREVA NP to interact with the NRC on the draft response. The schedule for the remaining questions is unchanged.

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

Question #	Response Date
RAI 354 - 03.08.02-13	November 1, 2010
RAI 354 - 03.08.05-21	**October 7, 2010**
RAI 354 - 03.08.05-22	January 13, 2011
RAI 354 - 03.08.05-23	October 1, 2010
RAI 354 - 03.06.02-33	November 18, 2010
RAI 354 - 03.06.02-34	November 18, 2010
RAI 354 - 03.06.02-35	November 18, 2010
RAI 354 - 03.06.02-36	November 18, 2010
RAI 354 - 03.06.02-37	November 18, 2010
RAI 354 - 03.06.02-38	November 18, 2010
RAI 354 - 03.06.02-39	November 18, 2010
RAI 354 - 03.06.02-40	November 18, 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 31, 2010 4:28 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40. On August 5, 2010 AREVA NP provided a revised schedule for Questions 03.06.02-42 and 03.08.05-23 in Supplement 5.

The attached file, “RAI 354 Supplement 6 Response US EPR DC.pdf” provides technically correct and complete FINAL responses to Questions 03.06.02-42 and 03.08.02-11 to 03.08.02-15, as committed. Because the response file contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This email and attached file do not contain any security-related information. An unredacted security-related version is provided under separate email.

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 354 Supplement 6.

The schedule for Question 03.08.02-13 is being revised to allow additional time for AREVA NP to address NRC comments. The schedule for the remaining questions is unchanged.

The following table indicates the respective pages in the response document, RAI 354 Supplement 6 Response US EPR DC.pdf," that contains AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 354 - 03.08.02-11	2	4
RAI 354 - 03.08.02-12	5	6
RAI 354 - 03.08.02-14	7	8
RAI 354 - 03.08.02-15	9	10
RAI 354 - 03.06.02-42	11	12

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

Question #	Response Date
RAI 354 - 03.08.02-13	**November 1, 2010**
RAI 354 - 03.08.05-21	September 8, 2010
RAI 354 - 03.08.05-22	January 13, 2011
RAI 354 - 03.08.05-23	October 1, 2010
RAI 354 - 03.06.02-33	November 18, 2010
RAI 354 - 03.06.02-34	November 18, 2010
RAI 354 - 03.06.02-35	November 18, 2010
RAI 354 - 03.06.02-36	November 18, 2010
RAI 354 - 03.06.02-37	November 18, 2010
RAI 354 - 03.06.02-38	November 18, 2010
RAI 354 - 03.06.02-39	November 18, 2010
RAI 354 - 03.06.02-40	November 18, 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: Thursday, August 05, 2010 6:23 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); CORNELL Veronica (EXT); WELLS Russell (RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 5

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions. AREVA NP submitted Supplement 4 on July 30, 2010, to provide final responses to Questions 03.06.02-32, 03.06.02-41 and 03.08.02-16 and a revised schedule for Questions 03.06.02-33 through 03.06.02-40.

The schedule for Questions 03.06.02-42 and 03.08.05-23 is being revised to allow additional time for AREVA NP to address NRC comments. The schedule for the remaining 15 questions is unchanged.

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

Question #	Response Date
RAI 354 - 03.08.02-11	August 31, 2010
RAI 354 - 03.08.02-12	August 31, 2010
RAI 354 - 03.08.02-13	August 31, 2010
RAI 354 - 03.08.02-14	August 31, 2010
RAI 354 - 03.08.02-15	August 31, 2010
RAI 354 - 03.08.05-21	September 8, 2010
RAI 354 - 03.08.05-22	January 13, 2011
RAI 354 - 03.08.05-23	**October 1, 2010**
RAI 354 - 03.06.02-33	November 18, 2010
RAI 354 - 03.06.02-34	November 18, 2010
RAI 354 - 03.06.02-35	November 18, 2010
RAI 354 - 03.06.02-36	November 18, 2010
RAI 354 - 03.06.02-37	November 18, 2010
RAI 354 - 03.06.02-38	November 18, 2010
RAI 354 - 03.06.02-39	November 18, 2010
RAI 354 - 03.06.02-40	November 18, 2010
RAI 354 - 03.06.02-42	**August 31, 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: Thursday, July 29, 2010 7:40 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions. Supplement 2 was submitted on June 24, 2010, and included a revised schedule for Questions 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23. AREVA NP submitted Supplement 3 on July 7, 2010, responding to 1 of the remaining 21 questions.

The attached file, “RAI 354 Supplement 4 Response U.S. EPR DC.pdf” provides technically correct and complete responses to Questions 03.06.02-32, 03.06.02-41, and 03.08.02-16. Because the response file

contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This email and attached file do not contain any security-related information. An unredacted security-related version is provided under separate email.

The schedules for Questions 03.06.02-33 through 03.06.02-40 are being revised to allow additional time for AREVA NP to address NRC comments. The schedule for the remaining 9 questions is unchanged.

The following table indicates the respective pages in the response document, "RAI 354 Supplement 4 Response U.S. EPR DC," that contain the AREVA NP response to the subject questions.

Question #	Start Page	End Page
RAI 354 - 03.06.02-32	2	3
RAI 354 - 03.06.02-41	4	6
RAI 354 – 03.08.02-16	7	7

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

Question #	Response Date
RAI 354 - 03.08.02-11	August 31, 2010
RAI 354 - 03.08.02-12	August 31, 2010
RAI 354 - 03.08.02-13	August 31, 2010
RAI 354 - 03.08.02-14	August 31, 2010
RAI 354 - 03.08.02-15	August 31, 2010
RAI 354 - 03.08.05-21	September 8, 2010
RAI 354 - 03.08.05-22	January 13, 2011
RAI 354 - 03.08.05-23	August 10, 2010
RAI 354 - 03.06.02-33	November 18, 2010
RAI 354 - 03.06.02-34	November 18, 2010
RAI 354 - 03.06.02-35	November 18, 2010
RAI 354 - 03.06.02-36	November 18, 2010
RAI 354 - 03.06.02-37	November 18, 2010
RAI 354 - 03.06.02-38	November 18, 2010
RAI 354 - 03.06.02-39	November 18, 2010
RAI 354 - 03.06.02-40	November 18, 2010
RAI 354 - 03.06.02-42	August 5, 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, July 07, 2010 5:27 PM

To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); CORNELL Veronica (EXT); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 on June 3, 2010, to provide a schedule for the remaining 21 questions.

On June 9, 2010, AREVA NP submitted draft Supplement 2 responses to questions 03.08.05-20, 03.08.05-21, 03.06.02-32, 03.06.02-41 and 03.06.02-42. Supplement 2 was submitted on June 24, 2010, and included a revised schedule to reflect the civil/structural re-planning activities and time allowance to interact with the NRC on the responses for 03.08.02-11, 12, 13, 14, 15, 16; 03.08.05-22 and 03.08.05-23.

The attached file, "RAI 354 Response U.S. EPR DC.pdf" provides a technically correct and complete response to Question 03.08.05-20.

The schedule for Question 03.08.05-21 is being revised to accommodate development of a revised response and to allow time to interact with the NRC on the response. The schedule for Questions 03.06.02-32, 03.06.02-41 and 03.06.02-42 is also being revised to provide additional time to interact with the NRC on the responses. The schedule for the remaining 16 questions is unchanged.

The following table indicates the respective pages in the response document, "RAI 354 Response U.S. EPR DC," that contain the AREVA NP response to the subject questions.

Question #	Start Page	End Page
RAI 354 — 03.08.05-20	2	3

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

Question #	Response Date
RAI 354 - 03.08.02-11	August 31, 2010
RAI 354 - 03.08.02-12	August 31, 2010
RAI 354 - 03.08.02-13	August 31, 2010
RAI 354 - 03.08.02-14	August 31, 2010
RAI 354 - 03.08.02-15	August 31, 2010
RAI 354 - 03.08.02-16	August 10, 2010
RAI 354 - 03.08.05-21	September 8, 2010
RAI 354 - 03.08.05-22	January 13, 2011
RAI 354 - 03.08.05-23	August 10, 2010
RAI 354 - 03.06.02-32	August 5, 2010
RAI 354 - 03.06.02-33	July 30, 2010
RAI 354 - 03.06.02-34	July 30, 2010
RAI 354 - 03.06.02-35	July 30, 2010
RAI 354 - 03.06.02-36	July 30, 2010
RAI 354 - 03.06.02-37	July 30, 2010
RAI 354 - 03.06.02-38	July 30, 2010
RAI 354 - 03.06.02-39	July 30, 2010
RAI 354 - 03.06.02-40	July 30, 2010
RAI 354 - 03.06.02-41	August 5, 2010

Question #	Response Date
RAI 354 - 03.06.02-42	August 5, 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: Thursday, June 24, 2010 12:29 PM
To: 'Tesfaye, Getachew'
Cc: ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); CORNELL Veronica (EXT); VAN NOY Mark (EXT); RYAN Tom (AREVA NP INC); GARDNER George Darrell (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. AREVA NP submitted Supplement 1 to the response on June 3, 2010, to provide a schedule for the remaining 21 questions, one of which was affected by the work underway to address NRC comments from the April 26, 2010, audit.

Based upon the civil/structural re-planning activities and revised RAI response schedule presented to the NRC during the June 9, 2010, Public Meeting, and to allow time to interact with the NRC on the responses, the schedule for questions 03.08.02-11, 12, 13, 14, 15, 16, 03.08.05-22 and 03.08.05-23 has been changed. The schedule for the remaining 13 questions remains unchanged.

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

Question #	Response Date
RAI 354 - 03.08.02-11	August 31
RAI 354 - 03.08.02-12	August 31
RAI 354 - 03.08.02-13	August 31
RAI 354 - 03.08.02-14	August 31
RAI 354 - 03.08.02-15	August 31
RAI 354 - 03.08.02-16	August 10, 2010
RAI 354 - 03.08.05-20	July 7, 2010
RAI 354 - 03.08.05-21	July 7, 2010
RAI 354 - 03.08.05-22	January 13, 2011
RAI 354 - 03.08.05-23	August 10, 2010
RAI 354 - 03.06.02-32	July 7, 2010
RAI 354 - 03.06.02-33	July 30, 2010
RAI 354 - 03.06.02-34	July 30, 2010
RAI 354 - 03.06.02-35	July 30, 2010
RAI 354 - 03.06.02-36	July 30, 2010
RAI 354 - 03.06.02-37	July 30, 2010

RAI 354 - 03.06.02-38	July 30, 2010
RAI 354 - 03.06.02-39	July 30, 2010
RAI 354 - 03.06.02-40	July 30, 2010
RAI 354 - 03.06.02-41	July 7, 2010
RAI 354 - 03.06.02-42	July 7, 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: Thursday, June 03, 2010 6:39 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); VAN NOY Mark (EXT); CORNELL Veronica (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided a response to 1 of the 22 questions of RAI No. 354 on April 15, 2010, and a schedule for the remaining 21 questions. The schedule for questions 03.08.02-11 through 15 is not being changed by this supplement. To allow time to interact with the NRC, the schedule for 16 questions is being changed. The date provided below for question 03.08.05-22 will be revised based on the information that will be presented at the June 9, 2010 public meeting and subsequent NRC feedback.

Question #	Response Date
RAI 354 - 03.08.02-11	July 30, 2010
RAI 354 - 03.08.02-12	July 30, 2010
RAI 354 - 03.08.02-13	July 30, 2010
RAI 354 - 03.08.02-14	July 30, 2010
RAI 354 - 03.08.02-15	July 30, 2010
RAI 354 - 03.08.02-16	July 30, 2010
RAI 354 - 03.08.05-20	July 7, 2010
RAI 354 - 03.08.05-21	July 7, 2010
RAI 354 - 03.08.05-22	July 30, 2010
RAI 354 - 03.08.05-23	July 30, 2010
RAI 354 - 03.06.02-32	July 7, 2010
RAI 354 - 03.06.02-33	July 30, 2010
RAI 354 - 03.06.02-34	July 30, 2010
RAI 354 - 03.06.02-35	July 30, 2010
RAI 354 - 03.06.02-36	July 30, 2010
RAI 354 - 03.06.02-37	July 30, 2010

RAI 354 - 03.06.02-38	July 30, 2010
RAI 354 - 03.06.02-39	July 30, 2010
RAI 354 - 03.06.02-40	July 30, 2010
RAI 354 - 03.06.02-41	July 7, 2010
RAI 354 - 03.06.02-42	July 7, 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: Thursday, April 15, 2010 5:46 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); VAN NOY Mark (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 354 Response US EPR DC.pdf" provides technically correct and complete responses to 1 of the 22 questions.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 354 Question 03.08.05-19.

The following table indicates the respective pages in the response document, "RAI 354 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 354 - 03.08.02-11	2	2
RAI 354 - 03.08.02-12	3	3
RAI 354 - 03.08.02-13	4	4
RAI 354 - 03.08.02-14	5	5
RAI 354 - 03.08.02-15	6	6
RAI 354 - 03.08.02-16	7	7
RAI 354 - 03.08.05-19	8	8
RAI 354 - 03.08.05-20	9	9
RAI 354 - 03.08.05-21	10	10
RAI 354 - 03.08.05-22	11	11
RAI 354 - 03.08.05-23	12	12
RAI 354 - 03.06.02-32	13	13
RAI 354 - 03.06.02-33	14	14
RAI 354 - 03.06.02-34	15	15
RAI 354 - 03.06.02-35	16	16
RAI 354 - 03.06.02-36	17	17

RAI 354 - 03.06.02-37	18	18
RAI 354 - 03.06.02-38	19	19
RAI 354 - 03.06.02-39	20	20
RAI 354 - 03.06.02-40	21	21
RAI 354 - 03.06.02-41	22	22
RAI 354 - 03.06.02-42	23	24

A complete answer is not provided for 21 of the 22 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	Response Date
RAI 354 - 03.08.02-11	July 30, 2010
RAI 354 - 03.08.02-12	July 30, 2010
RAI 354 - 03.08.02-13	July 30, 2010
RAI 354 - 03.08.02-14	July 30, 2010
RAI 354 - 03.08.02-15	July 30, 2010
RAI 354 - 03.08.02-16	June 3, 2010
RAI 354 - 03.08.05-20	June 3, 2010
RAI 354 - 03.08.05-21	June 3, 2010
RAI 354 - 03.08.05-22	June 3, 2010
RAI 354 - 03.08.05-23	June 3, 2010
RAI 354 - 03.06.02-32	June 3, 2010
RAI 354 - 03.06.02-33	June 3, 2010
RAI 354 - 03.06.02-34	June 3, 2010
RAI 354 - 03.06.02-35	June 3, 2010
RAI 354 - 03.06.02-36	June 3, 2010
RAI 354 - 03.06.02-37	June 3, 2010
RAI 354 - 03.06.02-38	June 3, 2010
RAI 354 - 03.06.02-39	June 3, 2010
RAI 354 - 03.06.02-40	June 3, 2010
RAI 354 - 03.06.02-41	June 3, 2010
RAI 354 - 03.06.02-42	June 3, 2010

Sincerely,

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

From: Tesfaye, Getachew [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, March 16, 2010 12:29 PM
To: ZZ-DL-A-USEPR-DL
Cc: Xu, Jim; Hawkins, Kimberly; Ng, Ching; Dixon-Herrity, Jennifer; Miernicki, Michael; Patel, Jay; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 354 (4106,4107,4220), FSAR Ch. 3

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on January 8, 2010, and discussed with your staff on February 25, 2010. Drat RAI Questions 03.08.05-23 was modified as a result of that discussion. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

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

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 3244

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D47EBE80)

Subject: Response to U.S. EPR Design Certification Application RAI No. 354, FSAR Ch. 3, Supplement 27
Sent Date: 7/14/2011 10:24:18 AM
Received Date: 7/14/2011 10:24:46 AM
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
"Miernicki, Michael" <Michael.Miernicki@nrc.gov>
Tracking Status: None
"Tesfaye, Getachew" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

Post Office: auscharmx02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	106335	7/14/2011 10:24:46 AM
RAI 354 Supplement 27 Response US EPR DC.pdf	658064	

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

Response to

Request for Additional Information No. 354, Supplement 27, Revision 4

3/16/2010

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 03.08.02 - Steel Containment
SRP Section: 03.08.05 - Foundations
SRP Section: 03.06.02 - Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping

Application Section: FSAR Ch 3

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

Question 03.08.02-13:

Follow-up to RAI 155, Question No. 03.08.02-4

The staff requests that the applicant submit the following information related to buckling analysis of the equipment hatch, the air locks, the closure for the construction opening, and the high energy piping penetrations:

(1) a description of the design-basis analyses conducted;

(2) a summary of the analysis results; and

(3) a comparison of results to ASME Section III, Subsection NE-3130 and/or Code Case N-284 acceptance criteria.

This information should also be included in FSAR Section 3.8.2. The applicable detailed calculations should be available for staff review at a future audit.

Response to Question 03.08.02-13:

Buckling analyses have been performed for the equipment hatch, airlocks, construction opening, and high energy piping penetrations (i.e., main steam and feedwater). The equipment hatch is qualified in accordance with NE-3222 and Code Case N-284-1. The airlocks are qualified in accordance with NE-3222. The construction opening is qualified in accordance with NE-3133. For high energy piping penetrations; it was determined that buckling is not a failure mechanism.

U.S. EPR FSAR Tier 2, Section 3.8.2.4 will be revised to provide additional information related to the containment penetration buckling analyses. A summary of the analysis performed for each appurtenance is provided in the following sections.

Equipment Hatch

A rigorous buckling analysis was performed in accordance with NE-3222.1(a)(1). Three-dimensional finite element submodels of each appurtenance were prepared in ANSYS, Version 11.0. Carbon steel SA-516, Grade 70 material was used and guidance on material properties was obtained from ASME Code, Section II, Part D. Material nonlinearities and large deformations were considered in accordance with NE-3222.1(a)(1). Material nonlinearity was simulated using the Bilinear Kinematic Hardening material model (BKIN) in ANSYS. The yield strength of the material S_y, is 33.6 ksi at 300°F. The plastic portion of SA-516, Grade 70 material, represented by tangent modulus, was conservatively assumed to be two percent of the elastic modulus. Large deflection command NLGEOM in ANSYS was enabled to account for geometric nonlinearity.

In the analysis, the steel liner and ring plate were fixed while constant increments of pressure were applied on the external surface. Other loads, such as seismic and dead weight, do not have any significant effect on buckling of the equipment hatch and have not been applied. The applied pressure was increased until the solution began to diverge. At this point, the analysis was stopped and the critical buckling stress was reached.

The maximum allowable buckling stress for Design and Levels A & B service limits was determined and provided in NE-3222.1(a) as one-third the value of the critical buckling stress. In accordance with NE-3222.2, the allowable limits for Level C and D service limits are 120 percent and 150 percent of the value provided in NE-3222.1, respectively. The applied pressure in each load condition was compared to the allowable limit to verify that the criterion is met.

The rigorous analysis critical buckling pressure is 257 psig. The lowest margin of 38 percent was determined for the design condition based on the applied pressure of 62 psig and the allowable pressure of 85.67 psig as one-third of the critical buckling pressure of 257 psig.

A critical buckling stress margin of 30 percent was calculated using the guidance of RG 1.193 and ASME Code Case N-284-1. Geometric imperfections in the equipment hatch were considered in accordance with the Code Case.

Airlocks

A linear Eigen value buckling analysis of the airlock cylinder and torispherical head and penetration sleeve assembly was also performed The resulting critical buckling pressure was 334 psig.

A rigorous buckling analysis was performed in accordance with NE-3222.1(a)(1). Three-dimensional finite element submodels of the airlocks were prepared in ANSYS, Version 11.0. Carbon steel SA-516, Grade 70 material was used and guidance on material properties was obtained from ASME Code Section II, Part D. Material nonlinearities and large deformations were considered in accordance with NE-3222.1(a)(1). Material nonlinearity was simulated using the elastic-perfectly plastic model for the airlock and the BKIN in ANSYS for the airlock hatch. The yield strength of the material S_y, is 33.6 ksi at 300°F. The plastic portion of SA-516, Grade 70 airlock hatch material, represented by tangent modulus, was taken as two percent of the elastic modulus. Large deflection command NLGEOM in ANSYS was enabled to account for geometric nonlinearity. The initial geometric imperfections in the airlock cylinder and torispherical head and the penetration sleeve assembly were conservatively simulated in the model by using two different approaches:

a) Based on the linear Eigen value buckling analysis results – the initial geometric imperfection was considered to be 1 percent of the Eigen value buckling mode shape, or 0.527 mm. This 1 percent buckling mode shape is the initial geometry for the rigorous nonlinear buckling analysis previously described (see Figure 03.08.02-13 -1).

b) Based on an ovalized cylinder that considers the tolerances of the assembly – the initial geometric imperfection was considered to be an ovalized cylinder with the difference in the major and minor diameter equaling the tolerance; 2 mm (see Figure 03.08.02-13 -2). An initial imperfection of 31 mm has also been modeled based on ASME Subsection NE, Paragraph 4221.1. The critical buckling pressure was reduced by approximately 3 psi or about one percent. The critical buckling pressure of the personnel airlock cylinder is therefore relatively insensitive to the size of the initial assumed imperfection.

The initial geometric imperfections in the airlock hatch assembly were simulated in the model based on the tolerances of the assembly.

In the analysis, the steel liner and ring plate were fixed while constant increments of pressure were applied on the external surface. The full magnitude of the other loads, such as seismic, dead weight, and live, was applied at the first load step. This is conservative because the application of a full magnitude of non-symmetric loads results in a lower critical buckling stress value. The applied pressure was increased until the solution began to diverge. At this point, the analysis was stopped and the critical buckling stress was considered to have been reached.

The maximum allowable buckling stress for Design and Levels A and B service limits was determined as one-third the value of the critical buckling stress per NE-3222.1(a). In accordance with NE-3222.2, the allowable limits for Level C and D service limits are 120 percent and 150 percent of the value provided in NE-3222.1, respectively. The applied pressure in each load condition was compared to the allowable limit to verify that the criterion was met.

The rigorous analysis critical buckling pressure of the airlock cylinder and torispherical head and penetration sleeve assembly is 251 psig based on the “Eigen value imperfection” and 242 psig based on the “ovalized cylinder imperfection.” Critical buckling pressure of the airlock hatches is 238.9 psig.

Conservatively, the lowest value of the airlock appurtenance was used for the qualification. The lowest margin of 28 percent was determined for the design condition based on the applied pressure of 62 psig and the allowable pressure of 79.63 psig as one-third of the critical buckling pressure of 238.9 psig.

Using the guidance of RG 1.193 and ASME Code Case N-284-1, the critical buckling stress margin for the airlock appurtenance is 45 percent for the calculated buckling stress of the airlock cylindrical part. However, calculations based on RG 1.193 and ASME Code Case N-284-1 are not considered as being directly applicable due to the complex geometry of the airlocks.

Construction Opening

Due to the simple geometry, the buckling analysis for the construction opening was performed in accordance with NE-3133, and an evaluation, in accordance with Code Case N-284-1, is not required. The maximum allowable external pressure is 79 psig. This value is higher than the pressure of any loading condition. The lowest margin for the design condition is 27 percent.

Main Steam Line and Feedwater Line Penetration

Buckling is not a failure mechanism for the main steam and feedwater line penetrations. These penetrations were analyzed using classical analysis where the slenderness ratio (KL/r) must be large enough for buckling to occur. For short columns (or piers) with a KL/r less than 89 (structural steel), the columns will reach yield before buckling occurs. The main steam line and feedwater line penetrations are defined as short columns (or piers). The calculated slenderness ratio is below 89, and therefore buckling will not occur.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 3.8.2.4 will be revised as described in the response and indicated on the enclosed markup.

Figure 03.08.02-13-1—Eigen Value Buckling Mode

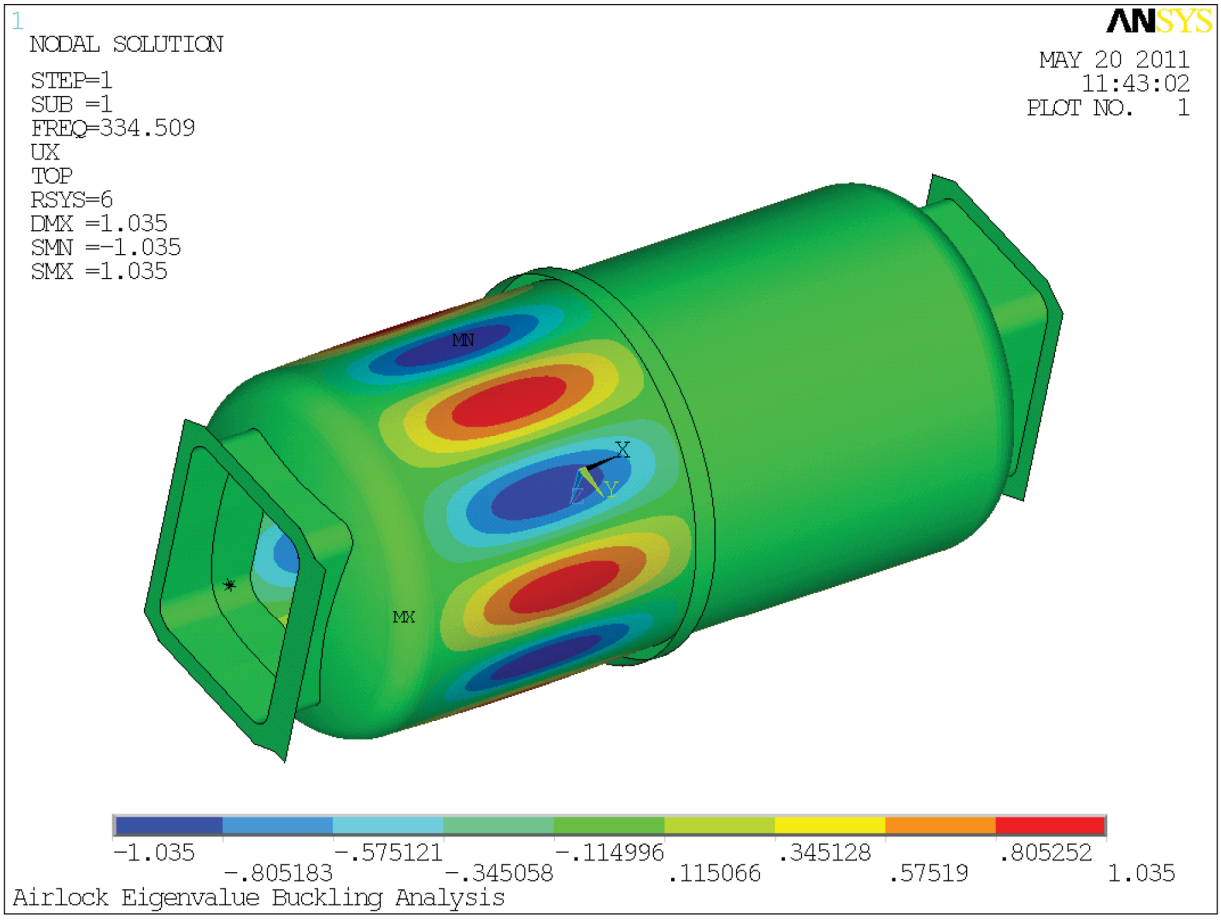
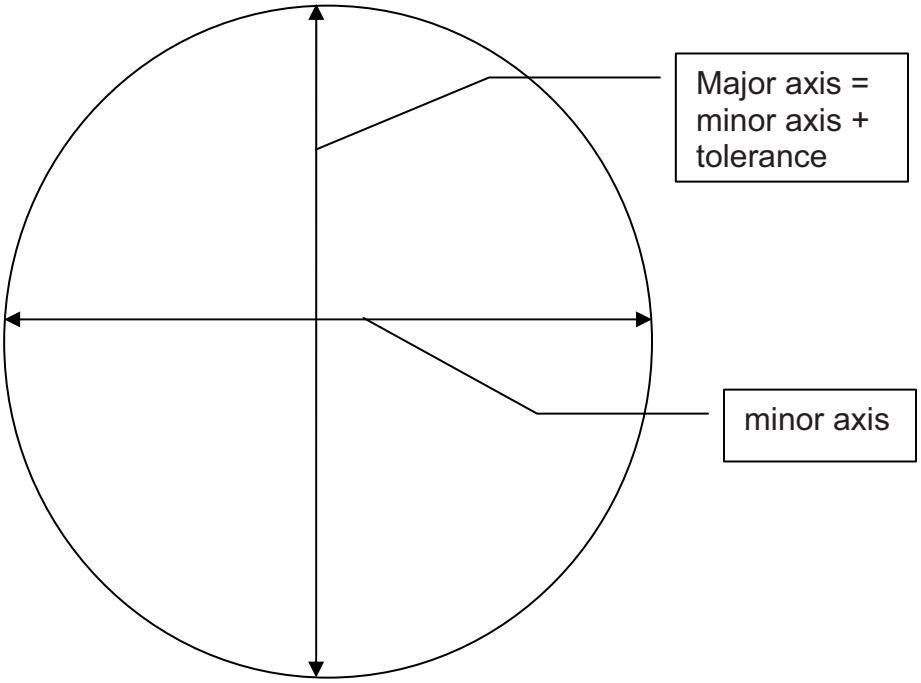


Figure 03.08.02-13-2—Ovalized Cylinder



U.S. EPR Final Safety Analysis Report Markups

Level D Service Limits

These service limit load combinations include other applicable service limits and dynamic loads for which containment function is required (GDC 2, GDC 4, and GDC 50).

$$P^* = D + L + T_a + R_a + P_a + R_{rr} + R_{rj} + R_{rm} + E'$$

$$P^* = D + L + F_a + E.$$

3.8.2.4 Design and Analysis Procedures

The steel items described in Section 3.8.2.1 are designed and analyzed in accordance with Article NE-3000 of Subsection NE of the ASME Code, Section III, Division 1, and as augmented by the applicable provisions of RG 1.57 (GDC 1 and GDC 16).

Containment penetrations, or portions thereof, within the jurisdictional boundaries defined by ASME Code, Section III, Division 1, Subsection NE do not exceed the stress intensity limits defined by Articles NE-3221.1, NE-3221.2, NE-3221.3, and NE- 3221.4 of the ASME BPV Code. The stresses induced by the concrete displacements on ASME Subsection NE, Class MC components are displacement limited and hence secondary in nature. Therefore the qualification of the design for primary stress criteria does not consider the effects of concrete displacement. The concrete displacements are non-cyclical. Therefore, ratcheting and fatigue failure of the penetrations due to concrete displacements are not evaluated. The concrete qualification of the ASME Subsection CC sleeve components.~~Code class shell components are evaluated for buckling under earthquake, thermal, and pressure loads. The method of analysis involves performing a linear buckling analysis using the Eigen value method to predict the theoretical buckling load, a non-linear buckling analysis considering large deflections and plasticity of the material to obtain a buckling pressure, and hand calculations per ASME Section III, Subsection NE-3133 to obtain a maximum allowable pressure. The calculated pressure is compared to 1/3 of the buckling pressure, and the smaller value is conservatively used as the allowable buckling pressure.~~

~~Simple geometries, e.g., piping penetrations, are qualified in accordance with NE-3133 or ASME Code Case N-284-1. The calculated stresses are compared to the allowable buckling limits for the particular design condition, e.g., design, testing, and Service Level A, B, C, D. More complex geometries (e.g., air locks) are analyzed using rigorous finite element buckling analyses.~~

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Buckling analyses are performed for the equipment hatch, airlocks, construction opening, and high energy piping penetrations (main steam and feedwater). The equipment hatch was qualified in accordance with NE-3222 and Code Case N-284-1. The airlocks were qualified in accordance with NE-3222. The construction opening is

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qualified in accordance with NE-3133. For high energy piping penetrations (main steam and feedwater); it was determined that buckling is not a failure mechanism for these penetrations.

Equipment Hatch

A rigorous buckling analysis was performed in accordance with NE-3222.1(a)(1). Three-dimensional (3D) finite element submodels of each appurtenance were prepared in ANSYS, Version 11.0. Material nonlinearities and large deformations were considered in accordance with NE-3222.1(a)(1). Material nonlinearity was simulated using the Bilinear Kinematic Hardening material model (BKIN) in ANSYS. Large deflection command NLGEOM in ANSYS was enabled to account for geometric nonlinearity.

In the analysis, the steel liner and ring plate were fixed while constant increments of pressure are applied on the external surface. Other loads, such as seismic and dead weight, do not have any significant effect on buckling of the equipment hatch and have not been applied. The applied pressure was increased until the solution began to diverge. At this point, the analysis was stopped and the critical buckling stress was reached.

The maximum allowable buckling stress for Design and Levels A & B service limits was determined by NE-3222.1(a) to be one-third the value of the critical buckling stress. In accordance with NE-3222.2, the allowable limits for Level C and D service limits are 120 percent and 150 percent of the value given in NE-3222.1, respectively. The applied pressure in each load condition was compared to the allowable limit to verify that the criterion is met.

Consideration of geometric imperfections in the equipment hatch is in accordance with RG 1.193 and ASME Code Case N-284-1.

Airlocks

A linear eigen value buckling analysis of the airlock cylinder and torispherical head and penetration sleeve assembly was also performed.

A rigorous buckling analysis was performed in accordance with NE-3222.1(a)(1). 3D finite element submodels of the airlocks were prepared in ANSYS, Version 11.0. Material nonlinearities and large deformations were considered in accordance with NE-3222.1(a)(1). Material nonlinearity was simulated using the elastic-perfectly plastic model for the airlock and the BKIN in ANSYS for the airlock hatch. Large deflection command NLGEOM in ANSYS was enabled to account for geometric nonlinearity. The initial geometric imperfections were conservatively simulated in the model based on the tolerances of the assembly.

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In the analysis, the steel liner and ring plate were fixed while constant increments of pressure were applied on the external surface. The full magnitude of the other loads, such as seismic, dead weight, and live, was applied at the first load step. This is conservative since the application of a full magnitude of non-symmetric loads results in a lower critical buckling stress value. The applied pressure was increased until the solution began to diverge. At this point, the analysis was stopped and the critical buckling stress was considered to have been reached.

The maximum allowable buckling stress for design and Levels A and B service limits was determined as one-third the value of the critical buckling stress per NE-3222.1(a). In accordance with NE-3222.2, the allowable limits for Level C and D service limits are 120 percent and 150 percent of the value given in NE-3222.1, respectively. The applied pressure in each load condition was compared to the allowable limit to verify that the criterion was met.

Construction Opening

Due to the simple geometry, the buckling analysis for the construction opening was performed in accordance with NE-3133, and an evaluation according to code Case N-284-1 is not required.

Main Steam Line and Feedwater Line Penetration

Buckling is not a failure mechanism for the main steam and feedwater line penetrations. These penetrations were analyzed using classical analysis where the slenderness ratio (KL/r) must be large enough for buckling to occur. For short columns (or piers) with a KL/r less than 89 (structural steel), the columns will reach yield before buckling occurs. The main steam line (MSL) and feedwater line penetrations are defined as short columns (or piers). The calculated slenderness ratio is below 89, and therefore buckling will not occur.

Combustible gas loads are pressure loads that result from a fuel-clad metal-water reaction followed by an uncontrolled hydrogen burn during a post-accident condition in a reactor containment (refer to Section 6.2.5). Combustible gas loads are evaluated according to the requirements of RG 1.216 and RG 1.136. RG 1.136, Regulatory Position C.5 provides acceptable loads and load combinations for use in reactor containment analysis and design of containments exposed to combustible gas loading conditions. U.S. EPR design does not include an inerting gas system. Hydrogen is the principal combustible gas considered in U.S. EPR design. The maximum containment pressure calculated for the U.S. EPR RCB is 75 psig. This pressure is taken from pressure load time histories of calculations that assume 100 percent fuel clad-coolant reaction followed by burning the hydrogen released by this reaction. RG 1.136, Regulatory Position C.5 and RG 1.7 specify a pressure of 45 psig combined with dead load (D) as a minimum design condition.