ArevaEPRDCPEm Resource

From: WILLIFORD Dennis (AREVA) [Dennis.Williford@areva.com]
Sent: Tuesday, February 14, 2012 6:02 PM
To: Tesfaye, Getachew
Cc: BENNETT Kathy (AREVA); DELANO Karen (AREVA); ROMINE Judy (AREVA); RYAN Tom (AREVA)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 16
Attachments: RAI 221 Supplement 16 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI 221 on June 17, 2009. Supplement 1 response to RAI 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 response to RAI 221 on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 and Supplement 7 on May 25, 2010 and July 7, 2010, respectively, to provide revised response schedules. AREVA NP submitted Supplement 8 response to RAI 221 on July 20, 2010 to address 2 of the 3 remaining questions. AREVA NP submitted Supplements 9, 10 and 11 on August 16, 2010, October 6, 2010 and November 2, 2010, respectively, to provide a revised response schedule for Question 06.02.01-24. Supplement 12 response to RAI 221 was submitted on November 23, 2010 to provide a revised response schedule for Question 06.02.01-24. Supplement 13 and Supplement 14 responses to RAI 221 were submitted on March 16, 2011, and April 13, 2011, respectively, to provide a revised schedule for Question 06.02.01-16 and Question 06.02.01-24. Supplement 15 response to RAI 221 was submitted on May 18, 2011 to provide a revised response for Question 06.02.01-16 and a final response for Question 06.02.01-24.

The attached file, “RAI 221 Supplement 16 Response US EPR DC.pdf,” provides a revised response to Question 06.02.01-24. 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 221 Question 06.02.01-24.

The following table indicates the respective pages in the response document “RAI 221 Supplement 16 Response US EPR DC.pdf,” that contain AREVA NP’s response to the subject question.

Question #	Start Page	End Page
RAI 221 — 06.02.01-24	2	2

This concludes the formal AREVA NP response to RAI 221, and there are no questions from this RAI for which AREVA NP has not provided responses.

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 18, 2011 3:13 PM
To: Tesfaye, Getachew
Cc: GUCWA Len (External RS/NB); WILLIFORD Dennis (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. 221, FSAR Ch 6, Supplement 15

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI 221 on June 17, 2009. Supplement 1 response to RAI 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 response to RAI 221 on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 and Supplement 7 on May 25, 2010 and July 7, 2010, respectively, to provide revised response schedules. AREVA NP submitted Supplement 8 response to RAI 221 on July 20, 2010 to address 2 of the 3 remaining questions. AREVA NP submitted Supplements 9, 10 and 11 on August 16, 2010, October 6, 2010 and November 2, 2010, respectively, to provide a revised response schedule for Question 06.02.01-24. Supplement 12 response to RAI 221 was submitted on November 23, 2010 to provide a revised response schedule for Question 06.02.01-24. Supplement 13 and Supplement 14 responses to RAI 221 were submitted on March 16, 2011 and April 13, 2011, respectively, to provide a revised response for Question 06.02.01-16 and Question 06.02.01-24.

The attached file, “RAI 221 Supplement 15 Response US EPR DC.pdf,” provides a technically correct and complete response to the 2 remaining 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 221 Questions 06.02.01-16 and 06.02.01-24.

The following table indicates the respective pages in the response document “RAI 221 Supplement 15 Response US EPR DC.pdf,” that contain AREVA NP’s response to the subject questions.

Question #	Start Page	End Page
RAI 221 — 06.02.01-16	2	2
RAI 221 — 06.02.01-24	3	3

This concludes the formal AREVA NP response to RAI 221, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

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

From: WELLS Russell (RS/NB)
Sent: Wednesday, April 13, 2011 5:09 PM
To: 'Tesfaye, Getachew'
Cc: GUCWA Len (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. 221, FSAR Ch 6, Supplement 14

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI 221 on June 17, 2009. Supplement 1 response to RAI 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 response to RAI 221 on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 and Supplement 7 on May 25, 2010 and July 7, 2010, respectively, to provide revised response schedules. AREVA NP submitted Supplement 8 response to RAI 221 on July 20, 2010 to address 2 of the 3 remaining questions. AREVA NP submitted Supplements 9, 10 and 11 on August 16, 2010, October 6, 2010 and November 2, 2010, respectively, to provide a revised response schedule for Question 06.02.01-24. Supplement 12 response to RAI 221 was submitted on November 23, 2010 to provide a revised response schedule for Question 06.02.01-24. Supplement 13 response to RAI 221 was submitted on March 16, 2011 to provide a revised response to Question 06.02.01-16 and Question 06.02.01-24.

To provide an opportunity to interact with the NRC staff on the responses to Question 06.02.01-16 and Question 06.02.01-24, the schedule for technically correct and complete responses is changed and is also provided below.

Question #	Response Date
RAI 221 — 06.02.01-16	May 18, 2011
RAI 221 — 06.02.01-24	May 18, 2011

Sincerely,

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

From: WELLS Russell (RS/NB)
Sent: Wednesday, March 16, 2011 4:00 PM
To: 'Tesfaye, Getachew'
Cc: GUCWA Len (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. 221, FSAR Ch 6, Supplement 13

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI 221 on June 17, 2009. Supplement 1 response to RAI 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 response to RAI 221 on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 and Supplement 7 on May 25, 2010 and July 7, 2010, respectively, to provide revised response schedules. AREVA NP submitted Supplement 8 response to RAI 221 on July 20, 2010 to address 2 of the 3 remaining questions. AREVA NP submitted Supplements 9, 10 and 11 on August 16, 2010, October 6, 2010 and November 2, 2010, respectively, to provide a revised response schedule for Question 06.02.01-24. Supplement 12 response to RAI 221 was submitted on November 23, 2010 to provide a revised response schedule for Question 06.02.01-24.

As discussed during a recent audit, the response to Question 06.02.01-16 is being changed and a schedule for providing a revised response if provided below. In addition, to provide an opportunity to interact with the NRC staff on the response to Question 06.02.01-24, the schedule for a technically correct and complete response to that question is changed and is also provided below.

Question #	Response Date
RAI 221 — 06.02.01-16	April 14, 2011
RAI 221 — 06.02.01-24	April 14, 2011

Sincerely,

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

From: BRYAN Martin (External RS/NB)
Sent: Tuesday, November 23, 2010 12:13 PM
To: Tesfaye, Getachew
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 12

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI 221 on June 17, 2009. Supplement 1 response to RAI 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 response to RAI 221 on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 and Supplement 7 on May 25, 2010 and July 7, 2010, respectively, to provide revised response schedules. AREVA NP submitted Supplement 8 response to RAI 221 on July 20, 2010 to address 2 of the 3 remaining questions. AREVA NP

submitted Supplements 9, 10 and 11 on August 16, 2010, October 6, 2010 and November 2, 2010, respectively, to provide a revised response schedule for Question 06.02.01-24.

To provide an opportunity to interact with the NRC staff on the response, the schedule for a technically correct and complete response to the remaining RAI 221 question is changed and is provided below.

Question #	Response Date
RAI 221 — 06.02.01-24	March 16, 2011

Sincerely,

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

From: BRYAN Martin (External RS/NB)
Sent: Tuesday, November 02, 2010 10:13 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 11

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI 221 on June 17, 2009. Supplement 1 response to RAI 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 response to RAI 221 on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 and Supplement 7 on May 25, 2010 and July 7, 2010, respectively, to provide revised response schedules. AREVA NP submitted Supplement 8 response to RAI 221 on July 20, 2010 to address 2 of the 3 remaining questions. AREVA NP submitted Supplement 9 on August 16, 2010 and Supplement 10 on October 6, 2010 to provide a revised response schedule for Question 06.02.01-24.

To provide an opportunity to interact with the NRC staff on the response, the schedule for a technically correct and complete response to the remaining RAI 221 question is changed and is provided below.

Question #	Response Date
RAI 221 — 06.02.01-24	January 7, 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, October 06, 2010 8:45 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 10

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI 221 on June 17, 2009. Supplement 1 response to RAI 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 response to RAI 221 on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 and Supplement 7 on May 25, 2010 and July 7, 2010, respectively, to provide revised response schedules. AREVA NP submitted Supplement 8 response to RAI 221 on July 20, 2010 to address 2 of the 3 remaining questions. AREVA NP submitted Supplement 9 on August 16, 2010 to provide a revised response schedule for Question 06.02.01-24.

To provide an opportunity to interact with the NRC staff on the response, the schedule for a technically correct and complete response to the remaining RAI 221 question is changed and is provided below.

Question #	Response Date
RAI 221 — 06.02.01-24	November 3, 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, August 16, 2010 2:47 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen (RS/NB); ROMINE Judy (RS/NB); BENNETT Kathy (RS/NB); GUCWA Len (External RS/NB)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 9

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI No. 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI No. 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI No. 221 was sent on December 18, 2009 to address

10 of the remaining 14 questions. AREVA NP submitted Supplement 5 to the response on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 on May 25, 2010, to provide a revised response schedule. To provide an opportunity to interact with the NRC staff on the response, on July 7, 2010, AREVA NP provided a revised response date for Questions 06.02.01-22 and 06.02.01-23. On July 20, 2010, AREVA NP provided a technically correct and complete response to these 2 questions.

The schedule for a technically correct and complete response to the remaining RAI 221 question is changed and is provided below.

Question #	Response Date
RAI 221 — 06.02.01-24	October 07, 2010

Sincerely,

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

From: BRYAN Martin (EXT)
Sent: Tuesday, July 20, 2010 3:51 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 8

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI No. 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI No. 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI No. 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 to the response on February 25, 2010, to address 1 of the remaining 4 questions. AREVA NP submitted Supplement 6 on May 25, 2010, to provide a revised response schedule. To provide an opportunity to interact with the NRC staff on the response, on July 7, 2010, AREVA NP provided a revised response date for Questions 06.02.01-22 and 06.02.01-23.

The attached file, “RAI 221 Supplement 8 Response US EPR DC.pdf,” provides a technically correct and complete response to 2 of the 3 remaining questions. The following table indicates the respective pages in the response document “RAI 221 Supplement 8 Response US EPR DC.pdf,” that contain AREVA NP’s response to the subject questions.

Question #	Start Page	End Page
RAI 221 — 06.02.01-22	2	2
RAI 221 — 06.02.01-23	3	4

The schedule for a technically correct and complete response to the remaining RAI 221 question is unchanged and is provided below.

Question #	Response Date
RAI 221 — 06.02.01-24	August 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: Wednesday, July 07, 2010 5:37 PM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 7

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI No. 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI No. 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI No. 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 to the response on February 25, 2010 and supplement 6 on May 25, 2010 to provide a revised response schedule. To provide an opportunity to interact with the NRC on the response, a revised date is provided below for questions 06.02.01-22 and 23.

Question #	Response Date
RAI 221 — 06.02.01-22	August 11, 2010
RAI 221 — 06.02.01-23	August 11, 2010
RAI 221 — 06.02.01-24	August 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: Tuesday, May 25, 2010 3:36 PM
To: 'Tesfaye, Getachew'

Cc: DELANO Karen V (AREVA NP INC); ROMINE Judy (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 6

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI No. 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI No. 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI No. 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. AREVA NP submitted Supplement 5 to the response on February 25, 2010 to provide a revised response schedule.

The responses to the 3 remaining RAI 221 questions are primarily dependent upon ongoing containment pressure analyses and component evaluations. Because of these ongoing activities, AREVA NP is not providing a response to the 3 remaining questions at this time. The revised schedule for technically correct and complete responses is provided below. The bases for the schedule change were discussed with NRC staff during a telecon held on May 24, 2010.

Question #	Response Date
RAI 221 — 06.02.01-22	July 7, 2010
RAI 221 — 06.02.01-23	July 7, 2010
RAI 221 — 06.02.01-24	August 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: DUNCAN Leslie E (AREVA NP INC)
Sent: Thursday, February 25, 2010 10:36 AM
To: 'Tesfaye, Getachew'
Cc: DELANO Karen V (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); ROMINE Judy (AREVA NP INC); BRYAN Martin (EXT); GUCWA Len T (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 5

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI No. 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI No. 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. Supplement 4 response to RAI No. 221 was sent on December 18, 2009 to address 10 of the remaining 14 questions. The attached file, “RAI 221 Supplement 5 Response US EPR DC.pdf,” provides a technically correct and complete response to 1 of the 4 remaining questions, as committed.

The following table indicates the respective pages in the response document, “RAI 221 Supplement 5 Response US EPR DC.pdf,” that contain AREVA NP’s response to the subject question.

Question #	Start Page	End Page
RAI 221 — 06.02.01-35	2	5

The schedule for technically correct and complete responses to the remaining RAI No. 221 questions is unchanged and is provided below:

Question #	Response Date
RAI 221 — 06.02.01-22	May 28, 2010
RAI 221 — 06.02.01-23	May 28, 2010
RAI 221 — 06.02.01-24	May 28, 2010

Sincerely,

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

From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, December 18, 2009 11:41 AM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); BEELMAN Ronald J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 4

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI No. 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. Supplement 3 response to RAI No. 221 was sent on September 30, 2009 to address 3 of the remaining 17 questions. The attached file, "RAI 221 Supplement 4 Response US EPR DC_PUBLIC.pdf," provides technically correct and complete responses to 10 of the 14 remaining questions.

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

The following table indicates the respective pages in the response document, "RAI 221 Supplement 4 Response US EPR DC_PUBLIC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 221 — 06.02.01-15	2	6
RAI 221 — 06.02.01-21	7	15
RAI 221 — 06.02.01-26	16	20
RAI 221 — 06.02.01-28	21	23
RAI 221 — 06.02.01-30	24	31
RAI 221 — 06.02.01-32	32	32
RAI 221 — 06.02.01-33	33	34
RAI 221 — 06.02.01-34	35	38

RAI 221 — 06.02.01-42	39	40
RAI 221 — 06.02.01-44	41	41

A response to four questions cannot be provided at this time. The schedule for technically correct and complete responses to the remaining RAI No. 221 questions has been changed and is provided below:

Question #	Response Date
RAI 221 — 06.02.01-22	May 28, 2010
RAI 221 — 06.02.01-23	May 28, 2010
RAI 221 — 06.02.01-24	May 28, 2010
RAI 221 — 06.02.01-35	February 25, 2010

Since three of the remaining questions are regarding the safety-related doors and/or foils and dampers for which the responses depend on performance of the subcompartment analysis (OPEN ITEM), AREVA NP requests a telecon with NRC staff in January to gain clarity regarding the scope of the needed response with the goal of improving the response dates provided above.

Sincerely,

Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
AREVA NP Inc.
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, September 30, 2009 4:19 PM
To: 'Tesfaye, Getachew'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); BEELMAN Ronald J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 3

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. Supplement 2 response to RAI No. 221 was sent on August 27, 2009 to address 8 of the remaining 25 questions. The attached file, "RAI 221 Supplement 3 Response US EPR DC.pdf," provides technically correct and complete responses to 3 of the 17 remaining 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 221 Question 06.02.01-18.

The following table indicates the respective pages in the response document, "RAI 221 Supplement 3 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 221 — 06.02.01-16	2	2
RAI 221 — 06.02.01-18	3	3

RAI 221 — 06.02.01-20	4	5

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

Question #	Response Date
RAI 221 — 06.02.01-15	December 17, 2009
RAI 221 — 06.02.01-21	December 17, 2009
RAI 221 — 06.02.01-22	December 17, 2009
RAI 221 — 06.02.01-23	December 17, 2009
RAI 221 — 06.02.01-24	December 17, 2009
RAI 221 — 06.02.01-26	December 17, 2009
RAI 221 — 06.02.01-28	December 17, 2009
RAI 221 — 06.02.01-30	December 17, 2009
RAI 221 — 06.02.01-32	December 17, 2009
RAI 221 — 06.02.01-33	December 17, 2009
RAI 221 — 06.02.01-34	December 17, 2009
RAI 221 — 06.02.01-35	December 17, 2009
RAI 221 — 06.02.01-42	December 17, 2009
RAI 221 — 06.02.01-44	December 17, 2009

Sincerely,

Ronda Pederson
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From: WELLS Russell D (AREVA NP INC)
Sent: Thursday, August 27, 2009 6:19 PM
To: 'Getachew Tesfaye'
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); SLIVA Dana (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 2

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. Supplement 1 response to RAI No. 221 was sent on July 31, 2009 to address 4 of the remaining 29 questions. The attached file, "RAI 221 Supplement 2 Response US EPR DC.pdf," provides technically correct and complete responses to 8 of the remaining 25 questions.

The following table indicates the respective pages in the response document, "RAI 221 Supplement 2 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 221 — 06.02.01-27	2	5

RAI 221 — 06.02.01-29	6	7
RAI 221 — 06.02.01-38	8	13
RAI 221 — 06.02.01-39	14	14
RAI 221 — 06.02.01-40	15	15
RAI 221 — 06.02.01-41	16	18
RAI 221 — 06.02.01-43	19	20
RAI 221 — 06.02.01-46	21	22

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

Question #	Response Date
RAI 221 — 06.02.01-15	December 17, 2009
RAI 221 — 06.02.01-16	September 30, 2009
RAI 221 — 06.02.01-18	September 30, 2009
RAI 221 — 06.02.01-20	September 30, 2009
RAI 221 — 06.02.01-21	December 17, 2009
RAI 221 — 06.02.01-22	December 17, 2009
RAI 221 — 06.02.01-23	December 17, 2009
RAI 221 — 06.02.01-24	December 17, 2009
RAI 221 — 06.02.01-26	December 17, 2009
RAI 221 — 06.02.01-28	December 17, 2009
RAI 221 — 06.02.01-30	December 17, 2009
RAI 221 — 06.02.01-32	December 17, 2009
RAI 221 — 06.02.01-33	December 17, 2009
RAI 221 — 06.02.01-34	December 17, 2009
RAI 221 — 06.02.01-35	December 17, 2009
RAI 221 — 06.02.01-42	December 17, 2009
RAI 221 — 06.02.01-44	December 17, 2009

Sincerely,

(Russ Wells on behalf of)
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From: Pederson Ronda M (AREVA NP INC)
Sent: Friday, July 31, 2009 2:51 PM
To: 'Tesfaye, Getachew'
Cc: BEELMAN Ronald J (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSARCh. 6 , Supplement 1

Getachew,

AREVA NP Inc. (AREVA NP) provided responses to 3 of the 32 questions of RAI No. 221 on June 17, 2009. The attached file, "RAI 221 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to 4 of the remaining 29 questions and a revised schedule for the one partial response (RAI 221 — 06.02.01-38c) of the remaining 29 questions.

The following table indicates the respective pages in the response document, "RAI 221 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 221 — 06.02.01-25	2	2
RAI 221 — 06.02.01-31	3	3
RAI 221 — 06.02.01-36	4	4
RAI 221 — 06.02.01-37	5	5

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

Question #	Response Date
RAI 221 — 06.02.01-15	December 17, 2009
RAI 221 — 06.02.01-16	September 30, 2009
RAI 221 — 06.02.01-18	September 30, 2009
RAI 221 — 06.02.01-20	September 30, 2009
RAI 221 — 06.02.01-21	December 17, 2009
RAI 221 — 06.02.01-22	December 17, 2009
RAI 221 — 06.02.01-23	December 17, 2009
RAI 221 — 06.02.01-24	December 17, 2009
RAI 221 — 06.02.01-26	December 17, 2009
RAI 221 — 06.02.01-27	August 27, 2009
RAI 221 — 06.02.01-28	December 17, 2009
RAI 221 — 06.02.01-29	August 27, 2009
RAI 221 — 06.02.01-30	December 17, 2009
RAI 221 — 06.02.01-32	December 17, 2009
RAI 221 — 06.02.01-33	December 17, 2009
RAI 221 — 06.02.01-34	December 17, 2009
RAI 221 — 06.02.01-35	December 17, 2009
RAI 221 — 06.02.01-38c	August 27, 2009
RAI 221 — 06.02.01-39	August 27, 2009
RAI 221 — 06.02.01-40	August 27, 2009
RAI 221 — 06.02.01-41	August 27, 2009
RAI 221 — 06.02.01-42	December 17, 2009
RAI 221 — 06.02.01-43	August 27, 2009
RAI 221 — 06.02.01-44	December 17, 2009
RAI 221 — 06.02.01-46	August 27, 2009

Sincerely,

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From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, June 17, 2009 5:41 PM
To: 'Getachew Tesfaye'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); GUCWA Len T (EXT); BEELMAN Ronald J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSARCh. 6 (Part 2 of 2)

Getachew,
Attached is response to RAI 221 (Part 2 of 2).

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From: Pederson Ronda M (AREVA NP INC)
Sent: Wednesday, June 17, 2009 5:09 PM
To: 'Getachew Tesfaye'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); GUCWA Len T (EXT); BEELMAN Ronald J (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSARCh. 6 (Part 1 of 2)

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 221 Response US EPR DC.pdf" provides technically correct and complete responses to 3 of the 32 questions.

The following table indicates the respective pages in the response document, "RAI 221 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 221 — 06.02.01-15	2	2
RAI 221 — 06.02.01-16	3	3
RAI 221 — 06.02.01-17	4	4
RAI 221 — 06.02.01-18	5	5
RAI 221 — 06.02.01-19	6	6
RAI 221 — 06.02.01-20	7	7
RAI 221 — 06.02.01-21	8	8
RAI 221 — 06.02.01-22	9	9

RAI 221 — 06.02.01-23	10	10
RAI 221 — 06.02.01-24	11	11
RAI 221 — 06.02.01-25	12	12
RAI 221 — 06.02.01-26	13	13
RAI 221 — 06.02.01-27	14	14
RAI 221 — 06.02.01-28	15	15
RAI 221 — 06.02.01-29	16	16
RAI 221 — 06.02.01-30	17	17
RAI 221 — 06.02.01-31	18	18
RAI 221 — 06.02.01-32	19	19
RAI 221 — 06.02.01-33	20	20
RAI 221 — 06.02.01-34	21	21
RAI 221 — 06.02.01-35	22	22
RAI 221 — 06.02.01-36	23	23
RAI 221 — 06.02.01-37	24	24
RAI 221 — 06.02.01-38	25	25
RAI 221 — 06.02.01-39	26	26
RAI 221 — 06.02.01-40	27	27
RAI 221 — 06.02.01-41	28	28
RAI 221 — 06.02.01-42	29	29
RAI 221 — 06.02.01-43	30	30
RAI 221 — 06.02.01-44	31	31
RAI 221 — 06.02.01-45	32	34
RAI 221 — 06.02.01-46	35	35

A complete answer is not provided for 29 of the 32 questions. The schedule for a technically correct and complete response to these questions is provided below.

Question #	**Response Date**
RAI 221 — 06.02.01-15	December 17, 2009
RAI 221 — 06.02.01-16	September 30, 2009
RAI 221 — 06.02.01-18	September 30, 2009
RAI 221 — 06.02.01-20	September 30, 2009
RAI 221 — 06.02.01-21	December 17, 2009
RAI 221 — 06.02.01-22	December 17, 2009
RAI 221 — 06.02.01-23	December 17, 2009
RAI 221 — 06.02.01-24	December 17, 2009
RAI 221 — 06.02.01-25	July 31, 2009
RAI 221 — 06.02.01-26	December 17, 2009
RAI 221 — 06.02.01-27	August 27, 2009
RAI 221 — 06.02.01-28	December 17, 2009
RAI 221 — 06.02.01-29	August 27, 2009
RAI 221 — 06.02.01-30	December 17, 2009
RAI 221 — 06.02.01-31	July 31, 2009
RAI 221 — 06.02.01-32	December 17, 2009
RAI 221 — 06.02.01-33	December 17, 2009
RAI 221 — 06.02.01-34	December 17, 2009
RAI 221 — 06.02.01-35	December 17, 2009
RAI 221 — 06.02.01-36	July 31, 2009
RAI 221 — 06.02.01-37	July 31, 2009
RAI 221 — 06.02.01-38c	July 31, 2009

RAI 221 — 06.02.01-39	August 27, 2009
RAI 221 — 06.02.01-40	August 27, 2009
RAI 221 — 06.02.01-41	August 27, 2009
RAI 221 — 06.02.01-42	December 17, 2009
RAI 221 — 06.02.01-43	August 27, 2009
RAI 221 — 06.02.01-44	December 17, 2009
RAI 221 — 06.02.01-46	August 27, 2009

Sincerely,

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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, May 19, 2009 7:30 PM
To: ZZ-DL-A-USEPR-DL
Cc: Walton Jensen; Christopher Jackson; Jason Carneal; Joseph Colaccino; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 221 (2792), FSARCh. 6

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 14, 2009, and on May 15, 2009, you informed us that the RAI is clear with exception of Draft RAI Question 06.02.01-15, Part 33. After further evaluation, the staff has determined that Draft RAI Question 06.02.01-15, Part 33 is unnecessary and it is deleted. Additionally, per your request, RAI 221 has been renumbered to break up the single RAI question with 32 parts into 32 separate questions, i.e. Question 06.02.01-15, Part1-32 are now Questions 06.02.01-15 - Question 06.02.01-46. 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: 3744

Mail Envelope Properties (2FBE1051AEB2E748A0F98DF9EEE5A5D4AE9184)

Subject: Response to U.S. EPR Design Certification Application RAI No. 221, FSAR Ch 6, Supplement 16
Sent Date: 2/14/2012 6:01:36 PM
Received Date: 2/14/2012 6:02:14 PM
From: WILLIFORD Dennis (AREVA)

Created By: Dennis.Williford@areva.com

Recipients:
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Tracking Status: None
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Tracking Status: None
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Tracking Status: None

Post Office: auscharmx02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	42597	2/14/2012 6:02:14 PM
RAI 221 Supplement 16 Response US EPR DC.pdf	525990	

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

Response to

Request for Additional Information No. 221, Supplement No. 16

5/19/2009

U.S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 06.02.01 - Containment Functional Design
Application Section: 6.2.1, Technical Report ANP-10299P

QUESTIONS for Containment and Ventilation Branch 1 (AP1000/EPR Projects)
(SPCV)

Question 06.02.01-24:

Provide technical specification surveillance requirements which will ensure that the foils and dampers of the CONVECT system and the safety-related doors in ANP-10299P perform their intended safety functions. The NRC staff requested that ITAACs be provided for these components in RAI 104:14-03.2.

Response to Question 06.02.01-24:

Inspections, tests, analyses, and acceptance criteria (ITAAC) for foils, dampers, and doors credited in the containment analysis described in Technical Report ANP-10299P, "Applicability of AREVA NP Containment Response Evaluation Methodology to the U.S. EPR for Large Break LOCA Analysis," are addressed in the Response to RAI 104, Question 14.03-1.

Changes to U.S. EPR FSAR Tier 2 Chapter 16, Technical Specifications Sections 3.6.9 and 3.6.10 (and corresponding Bases) were made in RAI 221, Supplement 15 for the rupture and convection foils, hydrogen mixing dampers, and sub-compartment doors. U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications, Section 3.3.1 (and corresponding Bases) were in revised RAI 221, Supplement 15 for addition of the hydrogen mixing dampers. Corresponding changes were made to U.S. EPR FSAR Tier 2, Table 1.7-1, Section 6.2.4, Chapter 7, Table 15.0-7, Table 15.0-8, and Chapter 16 Bases, Section 3.6.3 to reflect the addition of foils, dampers, and doors.

U.S. EPR FSAR Tier 2, Chapter 16, Technical Specifications Section 3.5.2 (and corresponding Bases) were revised in RAI 221, Supplement 15 to add new Surveillance Requirement 3.5.2.7 regarding required low head safety injection (LHSI) flow to the hot leg. U.S. EPR FSAR Tier 2, Chapter 16, Bases, Sections 3.5.4, 3.6.4, and 3.6.5 were revised for clarity.

This response includes additional conforming changes to clarify the door design in U.S. EPR FSAR Tier 2, Sections 6.2.1 and 14.2, and to Chapter 16, Technical Specifications and Bases 6.2.1 that were not in the previous submittal.

FSAR Impact:

U.S. EPR FSAR Tier 2, Sections 6.2.1 and 14.2.12, and Chapter 16, Technical Specifications and Bases 3.6.10 will be revised as described in the response and indicated on the enclosed markups.

U.S. EPR Final Safety Analysis Report Markups

The determination and evaluation of the minimum containment pressure transient are addressed in Section 6.2.1.5.

6.2.1.1.2 Design Features

The principal containment design features impacting the post accident pressure and temperature response are the IRWST, the conversion from a two-room containment into a one-room containment and passive heat sinks inside the containment.

The function of the IRWST is to provide a large reserve of borated water. It is the safety-related source of water for emergency core cooling in the event of a LOCA, and is a source of water for containment cooling and for core melt cooling in the event of a severe accident. The IRWST contains a minimum of 500,000 gallons of borated water and is maintained at a temperature between 60°F and 122°F. The IRWST resides at the lowest point in the containment, and drain paths allow water discharged from the RCS to drain into the IRWST.

Containment heat removal is accomplished by recirculation of cooled IRWST water injected into the RCS where the ECCS absorbs residual energy. The heated ECCS returning to the IRWST is subsequently cooled by LHSI heat exchangers.

The CONVECT system, consisting of rupture and convection foils in the steam generator equipment room ceiling and mixing dampers in the wall between the lower accessible area and the IRWST air space, transforms the two-room containment into a one-room containment. A steel framework at the upper boundary of the steam generator equipment rooms, houses rupture and convection foils with a combined opening area of 870 ft^2.

Large break LOCA (LBLOCA) and small break LOCA (SBLOCA) events establish different requirements for flow cross sectional area which is achieved by the different system components. For the LBLOCA, the full cross sectional area (870 ft^2) is used to limit the pressure peak. As a consequence of low mass and energy release during a SBLOCA event, the opening of all the rupture foils may not occur. For effective steam distribution in the containment, a minimum free-flow cross-sectional area of 450 ft^2 is fulfilled by the convection foils alone.

Eight fail-safe-open mixing dampers, with a total free flow cross-sectional area of 64 ft^2, connect the IRWST air space to the lowest accessible room. These open via spring tension on loss of power in fail-safe mode. They can also be opened and closed manually.

Safety-related doors are required to complete the transformation of the two-room containment into a one-room containment following a break of the pressurizer surgeline inside the pressurizer compartment. These safety-related reactor

containment building radiation doors are designed with a shear latch that allows them to open under the differential pressure following the accident, as described in this section.

The passive heat sinks inside the primary containment consist of all painted and unpainted concrete, steel structures and liner for the containment shell and IRWST surfaces. The IRWST heat sinks are exposed to the water in the pool. The remaining heat sinks are exposed to the containment atmosphere. These areas are approximately the same temperature as the containment ambient temperature during normal plant operation. The list of passive heat sinks in the U.S. EPR Containment and their parameters are listed in Table 6.2.1-4—Containment Heat Sink Inventory. Selected heat sinks were not included in the containment pressure-temperature analysis for conservatism. The minimum heat sink surface area for Tier 1, Section 2.1.1.1 is 64,998 m^2 or 699,633 ft^2.

The design pressure of the containment is 62 psig. Calculated containment pressures, based on the conservative analyses, are described in Sections 6.2.1.3 and 6.2.1.4.

The functional capability and frequency of operation of the systems provided to maintain the containment and subcompartment atmospheres within prescribed pressures, temperatures, and humidity limits during normal operation are discussed in Section 9.4.7.

6.2.1.1.3 Design Evaluation

Containment and subcompartment design parameters are provided in Table 6.2.1-5—Containment Initial and Boundary Conditions, and Table 6.2.1-4. The general arrangement drawings for the reactor containment are provided in Section 3.8.1. The structural design of the containment and the subcompartments, as well as the applicable codes, standards and guides that apply to the design of the containment structure, are addressed in Section 3.8. The structural design considers the effects of postulated piping ruptures, as discussed in Section 3.6.

The severity of the temperature rise and pressure peak resulting from a LOCA or MSLB depends upon the nature, size, and location of the postulated rupture. The U.S. EPR containment is designed to contain the energy released from the RCS in the event of a LOCA or from the steam generator (SG) during an MSLB.

In the case of a LOCA, reactor coolant at the primary system temperature is the source of the mass and energy released into the containment. A portion of the coolant is converted to steam and will remain as steam if its enthalpy is sufficient. Coolant released from the primary system causes an increase in containment steam mass, which in turn increases pressure and temperature.

coefficient was found to be conservative with respect to experimental data. Therefore, 1.7 Uchida is used to calculate the minimum containment pressure.

6.2.1.5.3 Other Parameters

The RLBLOCA methodology sets the initial containment pressure by sampling the containment volume. The combined containment free volume is 2.888×10^6 ft^3 which represents the sum of the nominal containment free volume and the nominal IRWST water volume, and is the lower bound of the containment volume sampling range. The sum of the combined containment volume and the internal structure volume yields the maximum containment free volume, 3.934×10^6 ft^3, the upper bound of the containment volume sampling range. The maximum containment free volume is conservative because a lower containment backpressure results in the highest calculated peak cladding temperature.

Heat transfer between the IRWST water and containment vapor is treated in a conservative manner. The IRWST is assumed to be well mixed, so the liquid temperature at the interface between the IRWST water and the containment vapor space is the bulk liquid temperature. This neglects heating of the surface water and maximizes the temperature differential for heat transfer. Water spillage rates from the accumulator in the broken loop are determined as part of the core reflooding calculation and are included in the containment code calculational model.

Developing the heat sinks in the ICECON model begins with the heat structure groups in the U.S. EPR GOTHIC containment model. Assumptions used in the GOTHIC model are then assessed for applicability to a conservative minimum back-pressure calculation. The passive heat sinks and thermo-physical properties were derived in accordance with Branch Technical Position 6-2, "Minimum Containment Pressure Model for PWR ECCS Performance Evaluation." Thus, an additional heat sink representing the uninsulated systems and components is incorporated into the ICECON model. However, the volume impact from this additional heat sink is not considered in the combined containment free volume or the maximum containment free volume calculations. An additional assumption increases the nominal heat transfer surface areas by 10 percent to increase the energy removed from the containment atmosphere, which is consistent with a conservative PCT calculation.

6.2.1.6 Tests and Inspections

Refer to Section 3.8.1.7 and Section 3.8.2.7 for testing and inspection requirements for the containment structure. Refer to Section 6.2.6 for the containment leakage rate testing program, and Section 6.6 for inservice inspection of ASME Class 2 and 3 components. Containment testing and inspections, and testing of safety-related reactor containment building radiation doors, are also included in the Technical Specifications (Chapter 16).

5.1.2 RWSS alarms, interlocks, and controls (manual and automatic) function as designed.

5.1.3 The RWSS pumps meet design requirements.

14.2.12.5.2 Reactor Containment Building Doors (Test #044)

1.0 OBJECTIVE

1.1 To perform testing to ensure that reactor containment building (RCB) radiation doors are capable of meeting design requirements.

1.1.1 Deleted~~Remote position indication is available outside of the RCB to determine if personnel can safely access the service area with standard radiation work permits~~.

1.1.2 Pressure relieving function (refer to Section 6.2.5).

1.1.3 Seal between the equipment compartment and the service compartment.

1.1.4 Radiation barrier between the radiation sources in the equipment compartment and the service compartment, where personnel access is allowed in MODE 1 (refer to Section 12.1).

1.2 To perform testing to ensure that RCB doors with pressure relieving panels are capable of meeting design requirements.

1.2.1 Pressure relieving function.

1.2.2 Seal between the equipment compartment and the service compartment.

1.3 To perform testing to ensure that RCB watertight doors are capable of meeting design requirements.

2.0 PREREQUISITES

2.1 Construction activities on the following have either been completed or exceptions have been recorded and the impact on the system performance has been determined.

2.1.1 RCB radiation doors.

2.1.2 RCB doors with pressure relieving panels.

2.1.3 RCB watertight doors

2.2 Test instrumentation is available and calibrated. A record of calibrated test instrumentation used with individual tracking number and calibration due date shall be recorded in the official test record.

2.3 Deleted.~~Instrumentation, including position indication of doors, has been calibrated and is operating satisfactorily prior to performing the following test~~.

2.4 Verify that RCB ventilation systems are capable of operating in various normal configurations.

3.0 TEST METHOD

3.1 Deleted~~Observe RCB radiation door remote position indication including alarms~~.

3.2 Observe force required to open RCB radiation doors with shear pins disengaged.

3.2.1 Deleted~~Breakaway torque~~.

3.2.2 Deleted~~Required torque to continue opening each RCB radiation door~~.

3.3 Observe that each RCB radiation door shear pin engages and the locking mechanism prevents unauthorized entry.

3.4 Observe that each RCB radiation door opens freely without obstruction.

3.5 Deleted~~Observe travel distance of each RCB radiation door when fully open~~.

3.6 Observe seal of each RCB radiation door when the door is shut.

3.7 Observe that each RCB door with pressure relieving aperture latch engages and the locking mechanism prevents unauthorized entry.

3.8 Observe seal of each RCB door with pressure relieving aperture when the door is shut.

3.9 Observe that each RCB door with pressure relieving panel is free to open without obstruction.

3.10 Deleted~~Observe RCB watertight door remote position indication, including alarms~~.

3.11 Observe that each RCB watertight door latch engages and the locking mechanism prevents unauthorized entry.

3.12 Observe that each RCB watertight door opens freely without obstruction.

3.13 Observe seal of each RCB watertight door when the door is shut.

3.14 Operate the RCB ventilation system in various configurations while positioning the doors and verify no adverse effects.

4.0 DATA REQUIRED

4.1 Deleted~~Alarm log for RCB door position~~.

4.2 Deleted~~Breakaway torque to open each RCB radiation door~~.

4.3 Required torque to continue to open each RCB radiation door.

4.4 Deleted~~RCB radiation door travel distance with door fully open~~.

4.5 Seal condition of the following:

4.5.1 RCB radiation doors

4.5.2 RCB doors with pressure relieving panels.

Table 3.6.10-1

RCB Compartment Doors

~~REVIEWER'S NOTE~~

~~Torque values required to open each Radiation Door at an assumed differential pressure of 2.9 psid +20% will be provided by the COL applicant.~~

RCB Elevation and Door Number	Door Function – Pressure Relief	Opening Torque
-8 ft Door 4	Non-Radiation Door, Blowout Panel	NA
-8 ft Door 7	Non-Radiation Door, Blowout Panel	NA
-8 ft Door 10	Non-Radiation Door, Blowout Panel	NA
-8 ft Door 11	Non-Radiation Door, Blowout Panel	NA
-8 ft Door 13	Non-Radiation Door, Blowout Panel	NA
-8 ft Door 14	Non-Radiation Door, Blowout Panel	NA
+5 ft Door 4	Radiation Door, Hinges Swing Open	~~[ ]~~500 ft-lb
+5 ft Door 5	Radiation Door, Hinges Swing Open	~~[ ]~~500 ft-lb
+5 ft Door 13	Radiation Door, Hinges Swing Open	~~[ ]~~500 ft-lb
+5 ft Door 14	Radiation Door, Hinges Swing Open	~~[ ]~~500 ft-lb
+29 ft Door 2	Radiation Door, Hinges Swing Open	~~[ ]~~500 ft-lb
+45 ft Door 2	Radiation Door, Hinges Swing Open	~~[ ]~~500 ft-lb
+45 ft Door 15	Non-Radiation Door, Blowout Panel	NA

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.10.1

Verifying, by visual inspection, that each RCB compartment door is not impaired by debris provides reasonable assurance that the radiation doors and non-radiation doors blowout panels are free to open in the event of a DBA. The 24 month Frequency is based on the passive nature of the doors and blowout panels.

Because of the high radiation in the vicinity of the RCB compartment doors during power operation, this Surveillance is normally performed during a shutdown.

SR 3.6.10.2

Verifying the opening torque of each radiation door provides reasonable assurance that the radiation doors have not developed excessive friction. The purpose of the Surveillance is to verify that in the event of a DBA, the radiation doors would open as assumed in the containment analyses. The safety-related radiation doors are designed with a shear latch that allows them to open under the differential pressure following an accident as described in Section 6.2.1.

The specified opening torque of 500 ft-lbs is sufficient to demonstrate that the doors have not developed excessive friction (freedom of movement) and is reasonable for testing, avoiding false failures, and is negligibly small with respect to the force exerted on the radiation door at a differential pressure of 2.9 psid +20%, as assumed in the containment analysis. The 24 month Frequency is based on passive nature of the radiation doors.

Because of the high radiation in the vicinity of the radiation doors during power operation, this Surveillance is normally performed during a shutdown.

REFERENCES

1. FSAR Section 6.2.